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Looks at Labor

Automated Routing May Bring on Strike Of Postal Workers

By Patrick Ward
Of the CW Staff

WASHINGTON, D.C. – Management describes it as fear. Labor calls it the "threat of robotization."

Whatever the reason, computers could cause the next U.S. Postal Service strike.

Behind it all is the Letter Carrier Route Evaluation System that the Postal Service has been testing in Kokomo, Ind. and now in Portland, Ore. There, two-man teams with measuring wheels have followed letter carriers on their rounds, taking note of the distance from the sidewalk to the house, the number of steps to climb and the lay of the land.

The teams also figure in street distances from scale maps and typical volumes of mail.

The Postal Service keypunches the data and then a computer system lists the work "value" of city blocks, which the local managers can combine into routes of equal work value.

Union opposition to the system centers on the "refusal of management to recognize the human stamina of the individual," said James E. Rademacher, president of the National Association of Letter Carriers.

"If they implement it beyond the testing cities, I have no alternative but to order a national work stoppage," he declared.

Current practice matches a route with a person's physical capabilities, Rademacher said, "but under this system everybody would get a route calculated to require the same physical effort."

The computer in no way takes into account the different strides, or gait, or endurance of the individual, he explained.

"A 60-year-old letter carrier, for example, may be expected to work a little slower than a 20-year-old. And a female letter carrier may be expected to have a shorter stride than a male.

"Under the computer system, the 60-year-old and the female may not fare so well," Rademacher said.

"We do adjust routes; that's the problem we're trying to eliminate," said James R. Braughton, director of delivery services for the U.S. Postal Service.

"We would like to avoid changing when the individual assigned to the route changes," he said. The new approach could be "a stabilizer for our delivery system.

"We can make a good physical inventory once, and then we won't have to change that until there's a change in that block," he pointed out.

"We still recognize the need to assist an

(Continued on Page 3)

IBM Readies Action on Leasing Deals

May Hike TLPs Up to 5% Yearly

ARMONK, N.Y. – IBM is now offering long-term leasing customers only limited one-year rate protection on its line of 370 virtual machines.

In a recent letter to Term Lease Plan (TLP) customers, the firm said it is reserving the right to raise rental prices under such four-year contracts by 5% after the first year, another 5% after the second year and a further 5% the final year of the contract. TLP customers must receive 90-day notification of rental increases.

In addition, IBM said purchase price protection will be limited to one year and after that it reserves the right to raise the purchase price a maximum 5% yearly.

The new regulations are in effect for any users who signed contracts under the TLP after Jan. 8. The 5% maximum increases will be levied only after IBM has announced general price increases, a spokesman said.

Equipment included under the plan are the 370/115, 370/125, 370/135, 370/145, 370/158 and the 370/168, along with their multisystem units, channels, consoles and power and coolant units.

The rates under the TLP are identical to the rates under the Monthly Availability Charge, but the user does not have to pay overtime charges if the system is used for more than one shift a day.

Applies to Monthly Rental

Under the new rate structure, the 5% maximum rate rise in each of the second, third and fourth years would apply to the basic monthly rental. A unit that cost $100/mo under the TLP in the first year, therefore, could be raised to a maximum of $105/mo the second year, $110/mo the third year and $115/mo the fourth year of the plan.

Similarly, the raises in the purchase price would be limited to 5% per year on the original purchase price and would not be cumulative, since the 5% price increase would always be applied to the original contract price.

The TLP changes do not alter the method by which the user garners purchase option credits. Under this option 50% of the customer's rental payments can be applied as credit toward the purchase of the equipment. A maximum of 50% of the purchase price can be accrued in this manner.

Plans to Collect Penalty Charges

By E. Drake Lundell Jr.
Of the CW Staff

ARMONK, N.Y. – IBM has promised "swift action" in collecting the penalty payments on long-term lease cancellations – penalties that were barred in the original Telex case decision.

In the Telex case, Judge A. Sherman Christensen originally barred IBM from enforcing cancellation penalties on long-term contracts then in effect and barred the firm from offering long-term contracts with cancellation penalty provisions for a three-year period.

And even though IBM was appealing the Christensen decision, it announced that it would voluntarily stop collecting such payments while the appeal was in process.

However, with the Christensen ruling overturned by the Tenth Circuit Court of Appeals [CW, Feb. 5], IBM last week said it would take "swift action" in order to get the Christensen bar on lease penalties overturned.

IBM has to apply to the lower court to have the order "vacated" in line with the appeals court decision. A hearing in the lower court could take place at any time, legal sources said last week, although none has been scheduled as yet.

Two Leasing Plans

The equipment affected by the ruling includes all cable-connected peripheral devices that are leased under either the IBM Fixed-Term Lease Plan or the Extended-Term Lease Plan.

While IBM would not comment last week on whether or not it would collect the penalty charges retroactively, it has reserved the right to do so and its past history indicates it will collect the charges from users who canceled leases during the time between the lower court and appeals court rulings.

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Delay Urged on SCDP Proposal Requiring State DP Licensing

By Patrick Ward
Of the CW Staff

CHICAGO – Two professional societies concerned with certification have stated that proposals to license DPers are "premature" and require more study.

Reacting to legislation proposed by the Society of Certified Data Processors (SCDP) and sent to state governments [CW, Dec. 11], the Institute for Certification of Computer Professionals (ICCP) said licensing may become socially desirable one day – but not yet.

"At the present time the DP profession does not have generally accepted definitions of job functions which could be licensed," according to a statement issued by the ICCP.

Neither have DPers agreed "upon the knowledge and skills which a given individual should have to practice in those jobs."

And, the ICCP statement noted, "the profession does not have a complete set of validated tests to measure individual knowledge in those undefined areas."

In a separate statement, the Data Processing Management Association (DPMA) said it was not opposed to certification or licensing. But, it said, the proposed SCDP package "should be submitted to the ICCP for committee study and ultimate development in a form which truly reflects the current needs of the DP profession."

Umbrella Organization

The DPMA developed the Certificate in Data Processing (CDP) exam which the ICCP has administered for the past year. The ICCP is an umbrella organization aiming toward "certification of computer people at a professional level," said its president John K. Swearingen.

Both the DPMA and SCDP are ICCP constituent members.

Swearingen said the CDP exam is oriented toward the middle and upper levels of DP management. The test concentrates on the business application of computers.

The ICCP is no longer offering the Registered Business Programmer (RBP) exam, which has suffered from a lack of interest and needs "a little updating and possibly some reorientation," Swearingen said. He expects it will be offered again in

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IBM Antitrust Trial Postponed; Document Copying Snafu Blamed

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – The trial of the U.S. Government's massive antitrust suit against IBM has been delayed by three to four weeks because of clerical problems in copying the extensive number of documents in the case.

The request for a delay from the Feb. 18 starting date was made jointly by attorneys for both sides last week and agreed to by Chief Judge David N. Edelstein, who is hearing the case.

While no new date was set for the trial, the parties agreed to meet this week to report on the progress of the document preparations so a new date could be set.

The move fueled rumors that the two sides were negotiating a consent decree in the case, although this has been denied by both parties.

The reason for the delay, according to attorneys for both sides, involves the internal IBM documents that were being copied by the government for use in the case.

Originally four sets of these documents were to have been prepared before last Christmas, and as recently as Jan. 15 the government lawyers felt they could catch up on the document preparation work by the first of February.

However, the addition of two teams of experts to the one previously assigned to the document work has not enabled the Department of Justice to catch up, Raymond Carlson, chief government attorney, reported last week.

Pages Mixed Up

The problem, according to Thomas Barr, lead IBM attorney, is that the copying service used by the government "destroyed" the document sets so it is now almost impossible to tell the order of

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IBM-Catamore Judge Upholds Trial Date

By Molly Upton
Of the CW Staff

PROVIDENCE, R.I. – Federal District Court Judge Raymond J. Pettine last week upheld the trial date of March 10 for the case of Catamore Enterprises, Inc. vs. IBM and overturned on appeal by IBM a previous ruling allowing reopening of discovery.

A week earlier, Magistrate Jacob Hagopian had reopened discovery to allow Catamore's attorney, Thomas K. Christo, to take depositions from nine current and former IBM executives. Christo said he made the request after he learned IBM would not voluntarily produce the executives as witnesses.

Pettine said, however, his latest ruling does not rule out the possibility the executives may be called upon to give depositions or to take the stand during the trial if Christo can prove their absence would cause Catamore's case to suffer manifest injustice.

The suit, filed by Catamore, a jewelry manufacturer, charges IBM with "underselling" and misrepresenting aspects of unbundling. The Catamore action was in response to a suit filed by IBM to collect $68,435 in back equipment rentals allegedly owed by Catamore [CW, May 22].

IBM's outside counsel, Edward F. Hindle of Edwards & Angell, said he saw "no useful purpose to subjecting high-level IBM personnel to pointless, time-consuming" harrassment.

Among the executives are Frank T. Cary, Thomas J. Watson Jr., Theodore Papes and Nicholas Katzenbach. An old statute exempts persons residing over 100 miles away from the court from answering requests to appear as witnesses.

There was no indication on the part of Catamore, Hindle said, that depositions from these people would be relevant to the case.

"Only unbridled imagination would suggest that Cary would try to harm customers," Hindle added.

There was little probability that Christo could prove that "nefarious management policies" were made known to branch personnel or that top management knew anything about Catamore, he said.

Much of the argument at the hearing centered on the chronicle of events leading up to the motion to reopen discovery. Catamore contended it had not received certain documents requested of IBM until after the close of discovery, which indicated the need for depositions from the IBM management.

Hindle noted these papers were from the Telex case and were "public record," adding that Christo had previously mentioned he had bought a copy of the documents and therefore had them in time to request depositions while discovery was still in process.

Christo's request to reopen discovery had previously been granted by Magistrate Jacob Hagopian, but IBM obtained a protective order and argued it would permit depositions to be taken from its executives only in Armonk, N.Y.

Catamore filed an objection to this ruling, at which point Pettine overturned the original order reopening discovery and reaffirmed March 10 as the trial date.

Indiana Food Stamp Automation Keeps Applicants Waiting Longer

By Patrick Ward
Of the CW Staff

INDIANAPOLIS – Indiana residents have had to wait longer to join the state's food stamp program since the state's welfare department began automating the process.

For more than two months county welfare departments have been mailing an applicant's certification data to Indianapolis rather than certifying the applicant and preparing an Authorization to Purchase (ATP) card on the spot.

The state welfare department keypunches data coming from the county offices, and an IBM 370/168 prints out the ATPs, which are returned to the county offices by United Parcel Service.

The aim of the automated approach is to tighten control of and to obtain better management information on the state's food stamp program, said James L. John, a state welfare department administrator.

The county welfare departments previously had been able to provide applications with ATPs in a single visit, but now the turnaround time of the automated system intervenes.

"They hope to have the system at the point where we can get the cards back within five days," one county caseworker said. "However, there have been numerous snags which have caused delays of eight to 10 days.

The result is that "we can't provide as good emergency service as before," she said.

"I think we could certainly service our clients much quicker if we were back on the old system," she said.

Delay Urged on SCDP Proposal

(Continued from Page 1)

the future.

The ICCP president sees both tests as parts of a full spectrum of validated exams that he would like to have ready before licensing comes into play.

'Very Positive'

SCDP's President, Kenniston W. Lord Jr., said the ICCP's statement was "very positive . . . in our view," since it recognized licensing "is inevitable.

"Had the SCDP not taken this action, how long would it have taken? Another five years? Ten?" he asked.

With the rate of change in the industry and the growing "potential for harm to the public, we can't wait very much longer," Lord warned. He sees the SCDP's proposal as a catalyst for action.

The pieces are coming together, Lord said. The American Federation of Information Processing Societies (Afips) has come out with job descriptions, the ICCP is working on certification tests, and now the SCDP has taken steps to legitimize the whole certification effort through licensing, he said.

The licensing proposals Lord sent to state governments would help to create a "top stratum in the DP profession" which could approve applications or otherwise see that the rules of generally accepted practice are observed, he said.

Certification tests, like the CDP, would be only one form of input to state boards deciding whether to license an individual, Lord continued. The proposed legislation also allows oral tests and takes work experience into consideration, he explained.

But ICCP's Swearingen observed that "coming to the conclusion of licensing is not something everyone agrees on."

Lord said the SCDP's licensing draft currently has sponsors in both the Massachusetts and New Hampshire legislatures.

On the Inside This Week

Snafu Forces IBM Trial Postponement

(Continued from Page 1)

pages in the document sets.

Apparently the copying service – which was not identified by the parties, even though Barr asserted that it was not an IBM service – mixed up the order of pages so badly that only the lawyers intimately familiar with the documents will be able to reconstruct them.

The documents are now so mixed up that Barr indicated they probably should have been "thrown away" when they came back from the copying service and the whole process started over.

However, he said, it is too late for that now since so much work has already been devoted to reconstructing the sets.

He indicated the sloppy work might have been due to the copying house "celebrating" before the holidays when the work was done.

The lawyers said they were planning to put 10 teams on the job of reconstructing the documents, including all of the lawyers involved in preparing the case, starting this week.

As a result they will "have to stop everything else" for the 10 days to two weeks that it will take to accomplish the job, according to Barr.

The job will "seriously impact" all other work in the case, Carlson agreed, adding there was no other solution to the problem than putting the lawyers on it full-time.

Because of the document situation, the parties agreed they would have been unable to accomplish their pretrial preparation work in time for the Feb. 18 trial date, necessitating the delay.

Spaeth Predicts

LANSING, Mich. – Harold J. Spaeth, the Michigan State University professor who uses a computer to predict Supreme Court decisions, says the odds are against the Supreme Court hearing the IBM-Telex case if it is requested to do so.

In a recent telephone conversation, Spaeth told *Computerworld* that, while he hadn't run it through the computer to be sure, his judgment told him the odds that the Supreme Court would hear an antitrust case in which the government was not a party were probably about 1 in 20.

"In hearing antitrust cases, the Supreme Court is really laying down government policy," Spaeth explained.

With the Justice Department antitrust suit against IBM about to get under way, the court probably would decide against hearing IBM-Telex because the outcome would undoubtedly affect the other case, according to Spaeth.

IBM to Collect Cancellation Fees

(Continued from Page 1)

In the original judgment, Christensen barred IBM from collecting penalty charges under any lease plans then offered but revised his decision a month later, ruling IBM could continue to collect penalties under the Fixed-Term Lease Plan and for some nonperipheral equipment under the Extended-Term Lease Plan.

At that time, IBM collected the penalty payments retroactively – that is, it collected from everyone who had canceled a lease during the time of the prohibition.

Reserved Right to Collect

If the firm follows that course in this case it would mean that any user who canceled a lease under one of these plans without paying the penalty charges during the past year will now be asked to ante up.

Originally IBM made it clear to users that it was just suspending the collection of the penalties and that it "reserved the right" to collect them in the future if the IBM position was upheld by a higher court.

The move was made, the firm said at the time, to remove "uncertainty" in the minds of users during the "time-consuming" appeals process.

The equipment that is affected by the decision to suspend the collection of penalty charges includes all of the equipment under the Fixed-Term Lease Plan and much of the equipment under the Extended-Term Lease Plan, including the Model 2 2914 switching unit; the 3203 printer; the 3330 disk storage unit; the 3333 disk storage and control unit; the 3340 disk; the 3348 data module; and the 3420 tape unit.

Also included are the 3504 card reader; the 3540 diskette I/O unit; the 3704 and 3705 communications controllers; the 3803 tape control unit; the 3830 storage control unit; the 3881 optical mark reader; the 3886 optical character reader; the 3890 document processor; and the 5425 multifunction card unit.

IBM last week said that it did not know the number of users that would be affected.

Automation May Fire Postal Service Strike

(Continued from Page 1)

individual, such as someone near retirement age or coming back from an illness," he said, but it could be done with the help of someone working overtime instead, Braughton explained.

Based on what has happened in Kokomo, Rademacher said national use of the route evaluation system would end 15,000 letter carrier routes. Braughton said it was too early to tell how many routes would be affected.

The system would not cut mail volume but would leave fewer carriers to handle it, Rademacher said.

Rademacher mentioned his group had no objection to computers as such and a route evaluation scheme could be acceptable, he said, "if somehow you could have consideration for the worker."

Braughton said fear of robotization was based on misunderstanding, "a lot of it on what role the computer will play."

Just the mention of the word "computer" arouses opposition, he said. "People are somewhat fearful of it because they don't understand it, for one thing."

The computer is only a tool, he explained. "It merely takes the information, assembles it and makes it available to the supervisor who still makes all of the decisions using his human judgment," Braughton said.

But he added the degree of measurement involved in the project is significantly more detailed than what the Postal Service has been doing, so "it would be virtually impossible for the line manager to compute and assemble all this information manually."

In the Econometric Sphere

Surprises Can Throw Models Out of Line

Most econometric forecasts using computer modeling of the economy "badly underestimated" today's double-digit inflation rate, according to Tom Juster of the Survey Research Center at the University of Michigan.

But "there is no question" computer modeling has made a substantial impact on improving forecasts of the economy," Leon Taub, senior economist with Chase Econometrics Associates, said.

"A forecast that we now consider bad, 15 years ago we would have considered good," he remarked.

Problems in forecasting the inflation rate came from surprises that weren't put in models. Among them were "raw material cartels, worse weather than we've normally had in the postwar years, things of that nature," Taub said.

Models are still clearly better at forecasting the economy when "things are going along smoothly in one direction.

"Because of the way they're constructed, [models] are very heavily dependent on effects which have continuity in time," he said. It is therefore more difficult to predict a turning point of some sort than to predict next year's growth rate in a system that is expanding at a fairly uniform rate.

This series was prepared by CW staffers Nancy French, Edith Holmes and Patrick Ward.

"On a track-record basis you might say the model doesn't have much to tell us about inflation rates because it has been so badly wrong in the past," Juster said.

"But it might be able to tell quite a bit about how much difference it makes to the inflation rate if you do or don't have a program of energy taxes," he said.

Apart from the surprises of history, modelers also have to represent the behavior pattern of millions of people in mathematical equations.

Another issue is whether modelers can factor in the "various kinds of expectations and attitudes and perceptions and plans" that affect the actions of consumers and businesses, Juster noted.

"If people's reactions to a variety of things are altered by inflation which is out of historical bounds, it is very hard for the model to capture that. It has nothing to work on.

"It can't look in the past because there is no past for those kinds of variables."

'Richer and More Complete'

Econometricians can improve their models by making them "richer and more complete," using measures of things that are not well-represented by standard economic variables but that could affect the economic behavior of both consumers and corporations.

Even now, though, Juster said, models can help economists balance out the implications and repercussions of economic changes.

When a forecaster just contemplates statistics, news reports and various other data, "it's very hard to get a sense of what it all adds up to and what kind of scenario represents a consistent picture," he said.

To get a result from a model, the user must be quantitative and specify a very large number of relationships, he said.

The forecaster lacking that kind of intellectual constraint is "freer," but may be putting together "a kind of implicit forecast . . . [with] some gross inconsistencies."

Are models getting better? Juster thinks so. "There was a period when the economists believed they finally understood the system they were working with, but that optimism has been dispelled," he said.

And models remain a pretty cost-effective way of doing things, Jared Enzler, a senior economist at the Federal Reserve Bank noted.

"There's a great deal less labor that goes into it after you have an effective model to work with," he said. "It'll tell you a lot of things without your having to think them through again each time."

IBM In-House Forecasting Used To Predict Demand for Products

"Being a good forecaster may be a gift you're born with, but you can carry it further if you use it systematically," according to Alvin J. Karchere, IBM's director of economic research.

And an econometric model is basically a tool that reduces "a lot of experience to something that is systematic," Karchere added.

IBM has relied on in-house econometric models for years to forecast both the U.S. economy and the demand for the company's products. The same techniques are now being used for international forecasts.

The company uses two national income and expenditure models in its forecasts of the U.S. economic picture. The quarterly model produces forecasts for use with the company's two-year operating plan.

An annual model is used in conjunction with the company's strategic plans, which project up to eight years ahead for some divisions, Karchere noted.

IBM also uses an input/output model focusing on industry supply and demand patterns.

The first two models each contain about 50 behavior equations, each one relating to some economic entity such as the consumption function of durables, Karchere explained.

The programs are mainly written in Fortran and run on 370/155s and a 360/91.

Product forecasters use data obtained from the models to "make a judgment about demand for our products." But the corporate economic staff also uses its econometric techniques to "do an aggregate check on their sales forecasts," Karchere added.

"If a plan comes through that sees the economy taking off like a bird in 1975, we can either tell them they're off base or, if need be, tell them that we are going to advise the next level of management that they are off base. I have no doubt that what we say is taken very seriously," Karchere said.

He admitted, though, that IBM's forecasters underestimated current levels of inflation, "but that's one most people missed." Company econometricians, however, were able to advise the company to look out for these conditions.

This ties in with Karchere's personal emphasis on the need for both "probable" and alternate "risk" forecasts in chancy economic times.

For example, in July of 1974 Karchere's group had forecast 60% probability of a dismal 1975 for the 1975-1976 operating plan. By October, the forecasters had switched over to the 40% probability "risk" forecast – which was less favorable, he said.

In his opinion, planning in corporations should have enough flexibility to adjust to other preset courses.

Econometric modeling can help in this regard, Karchere said. "We can be very explicit about fundamental assumptions" such as passage of a tax law, he said, and the econometrician can easily produce other forecasts describing what would occur if the bill did not pass.

Systematic Expression

The IBM researcher agreed that without historical data it is difficult for the econometrician to predict how consumer spending levels will react to inflation levels that are much higher than those experienced before.

"But rather than consult my navel," Karchere said, he'd still prefer to "extrapolate from data we have."

"A good forecaster's model is a systematic expression of what's happened in the past, but he really ought not to quit there."

Karchere said IBM decided to build its own in-house models, rather than using a dial-up service, because of an "if you want a good job done, do it yourself" attitude.

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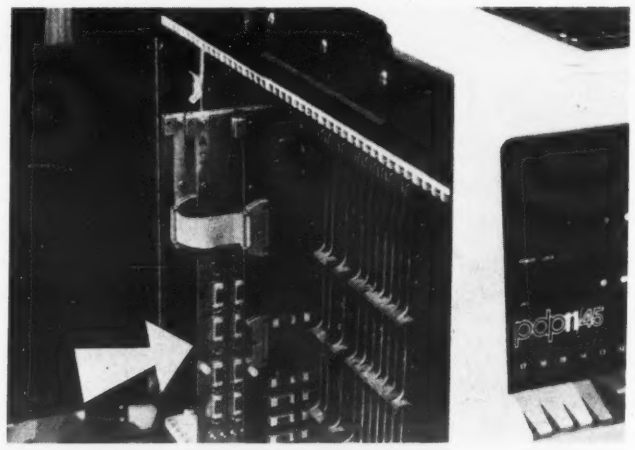

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Inquiry Package Aids In Search for Policy Of Misspelled Holder

SOUTHFIELD, Mich. – A data base inquiry package based on phonetic encoding techniques is helping an insurance group here find policy information filed by name, even when the correct spelling may not be known.

Designed by IBM for use with terminals, the Alpha Search inquiry system allows the League Insurance Group to provide a more personal touch in serving its policyholders by making it unnecessary for them to provide a certificate number when inquiring about a policy.

Computers At Work In Insurance

With Alpha Search, telephone inquiries are handled with a minimum of bother for the inquirer, who rarely has his certificate number at hand when he calls. While conversing with the customer, the terminal operator in customer services simply keys in the person's name; the company's IBM 370/145 computer runs a high-speed alphabetic file search and displays all certificate holder names that match the spelling entered.

If there is doubt about the correct name, the terminal operator asks the inquirer for a secondary identifier, such as birth date or credit union number. Normally, a match is achieved in a matter of seconds, the company said.

The operator indicates the match by touching a light pen to the appropriate name on the display, which calls up another screen displaying the certificate information needed to respond to the inquiry.

Correspondence Aid

The system also helps speed the processing of the company's heavy daily influx of customer correspondence which, in many cases, contains signatures that are illegible or, at best, difficult to decipher. This is complicated by the fact that few correspondents include their certificate number.

In cases where a signature is illegible or incomplete, the system allows the terminal operator to browse through the Alpha file for a partial last name or to search the file by entering known initials or a nickname.

Where a correspondent's last name is totally indecipherable, the terminal operator can enter any known secondary identifier, such as Social Security number, credit union number or birth date, plus a first name or first or second initial.

The Alpha Search system has also expedited internal office inquiries, providing necessary information in varying levels of detail to anyone in the company who needs it.

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Do more work in less time.

Most 3270's have a problem. They idle your operators when the mainframe goes down. And when it's up they waste a lot of line time retrieving centrally stored formats for data entry. Our 3270's are more thoughtful.

With our Store-and-Forward Mode your operators can key in data continuously... even during periods of line failure or central site down time. When on-line operation resumes, the locally stored records are transmitted to your central computer. The result—greater system availability and less information delay.

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Range checks. Algebraic relationships. Interfield dependencies. Conditional logic. Table comparisons. All can be handled locally to improve the accuracy of your transmitted data.

Entries may even be validated against local system files on which your customer records, inventory data, and accounting information are stored. Data from these files may also be integrated with keyed data for transmission. And with received data for display or printout.

Best of all, you can add all these enhancements—and more—at any time using COBOL subroutines... with no modification of your existing 3270 application programs, system software, or network configuration.

Make a smooth transition to Network Transaction Processing.

Everyone's talking about distributed processing. And its benefits. The only question is, how to get there?

With Four-Phase's 3270 it's easy—you're already on your way. Because at the heart of our display system is a business oriented computer. So whenever you're ready, you can grow from remote data entry and display to remote data processing and remote data management... on the same system.

Start with a simple 3270 replacement. Add memory—up to 96K bytes for your remote applications. Add discs—up to 200M bytes of local on-line storage. Add printers—with a range of speeds from 30 cps to 1800 lpm. Add card readers. Add tapes. Add terminals.

Then tie it together with software specifically tailored for Network Transaction Processing. COBOL—with extensions for *interactive* support of displays and keyboards. RPG for off-line reporting. Assembler. Sort/Merge. DOS. And our multikey ISAM for record retrieval by both primary and secondary search arguments.

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While Speeding Report Production

COM Solution to Paper Crisis Saves Firm $114,000/Yr

By Nancy French
Of the CW Staff

OMAHA, Neb. – Converting computer output from paper to microfilm is saving a large insurance company here $114,000 a year while at the same time speeding production and distribution of computer reports.

Computers At Work In Insurance

Mutual of Omaha, perhaps the largest individual and family health insurance company in the world, recognized its paper crisis as early as 1971.

A study group within the company discovered updating the policy reference books for the company's claims auditors alone took 36 tons of paper.

Those reference books, which detail more than 9,000 types of policies and 4,000 different riders the company has issued, filled about 35,000 pages in 31 separate volumes. About one-fifth of these pages are replaced annually, according to Wayne L. Landen, microfilm systems director of the planning staff.

The company's Information Services Systems Committee also found its two IBM 370/158s and several 360s were turning out tons of printout annually that still needed to be duplicated and then distributed. But the paper shortage, coupled with increasing costs, was only part of the problem.

DP Bottlenecks

"We were so loaded with processing that we couldn't get the throughput we needed with our slow-speed impact printers, even running 24 hours a day, and scheduling bottlenecks began to occur," Landen said.

"We had a great deal of information stored in the computer, such as the policyowner record file, that would have been useful in the right hands," Landen said, "but there didn't appear to be a practical way to get it there."

The policyowner record file, updated once a month, would have taken 50,000 pages of computer output and hours of computer time, according to Landen.

In light of the company's acceptance of microfilm for limited applications as early as 1957, the Information Services Systems Committee established a team in March 1972 to study computer output microfilm (COM) as a possible solution.

Proposals from four equipment manufacturers and four service bureaus were considered, and Mutual of Omaha installed the Kodak KOM-80 microfilmer in October 1972. With a capacity of 20 impact printers, the new system reduced output problems, freeing computer time for other work.

COM is much faster, Landen said, because the new system can transfer data at up to 120 char./sec from magnetic tape to microfilm. The transfer process involves photographing information stored on the tape from a CRT display inside the unit.

The film is processed in a self-threading Kodak Versamat Model 75 film processor that can be loaded in a lighted room. After processing, the film is cut into fiche by feeding the original into a Bruening OP-49/88 diazo roll-to-roll duplicator.

One operator can make up to 900 copies an hour, Landen said.

Initial conversion to COM eliminated the need for a computer forms printer, for a monthly saving of about $1,200. Rather than making hard copies in the computer service center, diazos were made at the COM center.

Users Like It

While a change from paper to microfiche meant a big change in habit for thousands of users, Landen said getting people to like the new format has not been a problem.

"In the beginning, we had to do a selling job, but users were brought in to help develop and test the output before it was adopted.

"We held special orientation programs for upper management and got a lot of support from the manager of administration," Landen recalled.

2,000 Readers

Getting enough COM readers, including 100 portable Xerox models, was the final selling point, according to Landen, who estimated that Mutual of Omaha now owns about 2,000 readers of various makes and models.

But the real breakthrough occurred, according to Landen, when its programmers switched to COM.

"Programmers have to compile programs over and over in the debugging process," Landen explained, "and that takes a lot of paper. But they showed us how they could write their notations on notepaper just as easily."

Some computer programs can be reformatted for COM in just a few days, with software developed jointly by Mutual of Omaha and Eastman Kodak Company. However, many times it is found worthwhile to redesign the computer program to take advantage of the special features of COM, Landen said.

Converting the programs saved another $5,000 on an annual basis, he said.

During the two years since the company's initial conversion, more than 150 programs have been converted to COM. In that time, the COM device has been producing 1,700,000 images per month in about 90 hours – the equivalent of more than 1,700 hours of impact printer time.

Further, some of the new COM applications are reports that would not have been practical before COM. One 1,200-page report that goes to 150 people now takes only six fiche and can be completed in about six hours.

Most important, Landen said, there are only six diazo duplicates to store and handle at each user station instead of 1,200 pages of printout.

Who Can Use It

A decision to convert from paper to microfilm at Mutual of Omaha is based on three criteria: the size of the report, the number of duplicates that must be made and the frequency of the report's use.

"Right now, nothing less than about 200 pages is put on microfiche," Landen explained.

Terminal in Hand, Salesman Has Time to Sell

NEW YORK – An insurance salesman here, portable terminal in hand, has reduced the number of visits needed to make a sale by calculating right in the clients' home the rates and options available.

Computers At Work In Insurance

Now in his third year of selling insurance with the terminal, Lloyd Probber, a chartered life underwriter as well as a property and casualty underwriter, estimates the terminal costs him 5% of his annual commissions – but he feels it's well worth the money.

"The time I used to spend doing calculations in the office I now spend calling on clients. Looking back, I feel like Prometheus when he discovered fire," Probber exclaimed.

Probber is one of several hundred insurance sales people who buy interactive time-sharing services from ISSS, Inc., a firm here that runs its insurance software on a Digital Equipment Corp. Decsystem-10 time-sharing system operated by Compu-Serv in Columbus, Ohio.

The beauty of the system, according to Richard Fisher, director of systems development for ISSS, is that the salesman doesn't have to know anything about computers to use the terminal effectively.

The salesman simply jots the information required from his rate book on a simple worksheet to help organize it, then keys in the client's name, age and the rate structure for the policy he is suggesting.

Or, working backward, he can key in the amout of equity the client is shooting for and tell the computer to calculate how much the client has to spend.

Within seconds, a hard copy is printed out for use in making his presentation and discussing the various options open to the client.

The salesman must have his own rate book since the computer has rates for only a few insurance companies. The software does all the calculations, asks the questions and provides the options.

"The salesman can calculate any company's illustrations on our system without previously putting any data in," Fisher explained. All he need do is put in data pertinent to his particular client.

Are people impressed with such a device? "You bet they are," Probber said.

"The terminal has charisma. People are really snowed when they find out that, by merely dialing a phone number, you can be on-line with a high-speed computer."

More often than not, the ability to provide information in the home about all the options the client is considering enables the salesman to close the sale in one visit.

"That's a big difference from the old days," Probber said, noting he explored several other options before deciding on the terminal.

"When I realized I was spending too much time doing calculations and not enough time selling, I looked around for someone else to do the calculations," he said.

"I found a service that worked fine, but I would send in the sheets and it took several weeks to get the calculations back.

"Even when we got the turnaround time down to five days, if there was an error on one of the numbers the sheet had to go back again, and it still took two weeks," he lamented.

Buying his own minicomputer was the next option Probber considered, but to swing the cost he decided he would have to sell time.

"Getting the terminal and buying time was cheaper and better and the best way for me to go," he explained.

The major difference between ISSS and similar services is that ISSS is completely interactive and requires no data processing background.

"Our customers never reach the monitor – they're constantly captured within our programs that are designed to do what they want to do and express it in their own language," he explained.

While Probber uses the 25-lb CDI 1030 Teleterm available from Computer Devices, Inc., any time-sharing terminal can be used, according to ISSS.

Retrieval System Developed In-House Speeds Claims

By Nancy French
Of the CW Staff

BOSTON – CRT terminals are quickly replacing adding machines and giant worksheets as the everyday working tools for John Hancock Mutual Life Insurance Co.'s claims approvers.

Until recently, life and health insurance companies had been slower than casualty and auto insurance vendors in moving toward interactive real-time systems for claims processing. Doctors could wait, and batch systems were efficient enough for processing one-time death claims.

Computers At Work In Insurance

But high-cost claims from group medical policyholders were increasing. So, too, were the delays caused by clerical errors or omissions on claims forms.

In addition, a variety of national health insurance proposals now under congressional consideration portended major increases in processing workload.

Hancock DP executives decided they needed a better way to process claims in the regions where they originated with systems support from the company's large-scale IBM 370/168 home office computer, according to George E. Wallace, vice-president for data processing.

Developed entirely in-house, the new system is John Hancock's Speedy Transmission and Retrieval System, dubbed Hanstar by the company.

Hanstar, a real-time interactive claims processing system, leads the claims approver through a series of questions to assure every question that might have a bearing on payment of a claim is answered.

The system has been installed in six locations to date, including the home office where the company's own employees' insurance claims are processed. The company's 25 regional offices will be tied in by mid-1976.

Under the new system, each claims approver has his own interactive terminal at his desk. The terminal gives him access to a data base containing the characteristics on all the company's group policies as well as a prior claim history for each policyholder and a file of providers – physicians and hospitals.

In addition, the system does all the arithmetic needed to process a claim.

To begin processing a claim, the approver needs only to key in the name of the policyholder. Within a maximum of eight seconds, the first screen will appear, showing the policyholders complete prior claims history.

The approver first checks to see if the bill in hand is a duplicate or a new bill. If it is new, he is ready to initiate the approval procedure.

After determining what type of coverage a policyholder has, the computer leads the approver through a series of eight screens until every possible claims question is answered and payment provided under each category of the policy has been calculated.

If the approver keys in a payment for something under which the policyholder is not covered, a light on the terminal will flash, indicating the case does not have that type of coverage.

If a claims approver is interrupted in "midclaim" with a question about another policy, he can use the system's "hold" capability to set aside the claim he is working on and bring the other policyholder's file on to the screen.

As a by-product of the approval procedure, the computer updates the prior claims history record and stores on tape the amount of the check to be issued along with a complete list of the benefits covered for printing on the check stub, Wallace said.

Checks are batch-printed every night and mailed from the home office.

The manual batch-oriented system Hanstar is replacing handled claims approval with paper tape terminals and the U.S. mails.

After a worksheet was hand-processed for each claim, the paperwork was sent to clerks who typed the checks with an accompanying abbreviated statement of the benefits covered on the terminals.

Simultaneously, the information was recorded on a paper tape that was mailed to the home office. There, the paper tape was transferred to magnetic tape and verified in a batch run.

Because claims weren't verified by computer until after the payments were mailed, adjustments often had to be made and additional checks prepared.

Wallace pointed out the new system verifies each claim during the approval process, thereby eliminating any costly followup.

The batch run that produces the checks also prints a hard copy of the payment information for storage by date in a permanent file.

An in-house project from the start, Hanstar planning began in August 1970 with a team of three people, Wallace explained. The system took about 150 man-years to complete, he estimated, with as many as 57 people assigned at one peak period.

Several languages were considered, but PL/I turned out to be the most efficient for the mathematics and data manipulation needed to process and pay the claims, Wallace said.

Although the systems design work has been completed for some time, a staff of 25 still assigned to the project is completing a long list of maintenance chores that accumulated during the design phase.

When the system is fully operative, the 168 will support 400 claims approvers processing about 2,500 claim/hr.

One by one, regional office managers are being brought into the home office for training. Once trained, they conduct a local training effort to familiarize the approvers in their local offices.

Wallace estimated the system has sufficient capacity to handle claims processing through 1978 or 1979. He added the new claims approval processing will still take only approximately 15% of the company's DP capacity.

When the system becomes overloaded, Hancock officials intend to split the file and get a second 168 rather than going to a bigger CPU, Wallace explained.

A bill believed to have been already paid is brought in for checking by a claims approver, who has instant access to records through a CRT terminal on her desk.

Editorials

No Guarantee

The main argument for licensing computer professionals by state regulatory boards appears to be that such a procedure would protect the public from poor or malicious systems design.

Yet there is no proof – either in history or in the present proposals for licensing – that such a result would occur.

The proponents of licensing – mainly the Society of Certified Data Processors – compare the proposal with the regulations governing doctors, lawyers and certified public accountants (CPA), with heaviest emphasis on the CPA analogy.

But the regulations on each of these groups have not prevented abuses.

Some licensed yet still unscrupulous doctors perform unneeded operations on patients for large fees. State licensing has done little to stop this practice and it appears that self-regulation often ends up to be more self-serving than public service.

The number of lawyers caught up in the net of Watergate should be a reminder that licensing and state-administered examinations do not instill morality in a noble profession.

And, finally, the record of CPAs in uncovering such things as illegal corporate campaign contributions has been notably blank. The CPAs signed – yes, certified – company reports that made no mention of such contributions and it took concerted political and reportorial digging to uncover them.

This is not to say that all doctors perform unneeded operations, that all lawyers are guilty of Watergate-type abuses or that all companies mislead their CPAs.

But it does indicate the existence of licensing has not prevented abuses in these fields and there is no evidence that licensing in the DP field would be any different.

The sponsors of the licensing idea, therefore, should find some new justifications for their proposals if they want to sell them to a wide range of people in the computer community.

To date, however, they have advanced few other arguments for the proposal, relying solely on the need for the public to be protected from unethical systems.

Unfortunately for that argument, people are people, whether licensed or not. Some will be unethical no matter what type of examinations they have passed and some will be unethical no matter how many codes of ethics they have read and signed.

Licensing will have little effect on unethical behavior and may serve just to assuage the egos of some in the computer community who are adept at taking tests, rather than protect the public.

At the same time, such a scheme could serve to hold back innovative solutions to systems and programming problems, particularly if the personnel who are licensed do not have to prove that their knowledge is up-to-date on a regular basis.

DP people should put the idea of DP professionalism behind them and work to serve more effectively the companies and institutions in which they find themselves.

Instead of being a "DP professional," programming and systems people in banking, for example, should be banking professionals, using their DP talents to make banking more effective and to serve the needs of the banking public better. Of course, the example could be repeated for every industry and category.

Let's forget the games and politics of societies and other self-interest groups and get on with serving the public responsibly and efficiently.

Letters to the Editor

Efficiencies Forced on Mini User Not Necessarily to His Benefit

I wholeheartedly endorse Herb Grosch's "Miniperspectives" column [CW, Jan. 22].

Having installed systems from Digital Equipment Corp.'s (DEC) PDP-8/L to dual IBM 370/158s, I am only too aware of the efficiencies happily "forced on the mini user" and the overhead excesses of cumbersome IBM-type systems software.

In the past, the Digital Equipment Corporation Users Society (Decus) has produced a large number of efficient system control, compiler and application programs for DEC computers. They were based on "limited peripherals, small memories and curtailed instruction sets" and they were really effective and efficient.

I hope DEC management takes serious heed of Grosch's very apropos article.

Lyle P. Bickley, Director
Product Planning
Fidelity Computer Services, Inc.
Philadelphia, Pa.

'Gutter Language' Unprofessional

I should like to protest against the gutter language printed in Herb Grosch's "Miniperspectives" column. In spite of the well known aversion of Grosch to anything bearing the IBM trademark, I feel there are more descriptive adjectives than "cr..py."

If Grosch naturally writes this way, the editor has a duty to censor obscene language.

We are continually being exhorted to become more professional; I wonder if this language would appear in a professional medical journal or in the publication of the Association for Computing Machinery? I trust that in the future we will not be exposed to any more examples of obscenity or graffiti.

Robert C. Fish

Dover, N.J.

Econometrics Deposes Science

Having read your first installment in the series on econometrics [CW, Jan. 29], I cannot help but be astonished, albeit somewhat gratified.

Taken collectively, the argument for applied science seems to read:

- "Incorporate a set of assumptions that no longer apply" (Dennis Meadows).
- Model these into a set of some 900 to 3,000 equations, of which 300 to 400 will form a basis for errors (Lawrence R. Klein).
- Run the model to "determine what went wrong" (Otto Eckstein).
- Finally, since the "models are seldom readily comprehensible" (Milton Friedman), having been constructed with "judgmental bias" and an inflexibility to respond to changing conditions (Eckstein), have the economist interpret the output!

Hoo hah! So much for the discipline of mathematical science.

I am comforted, however, by Friedman's remark that economists seldom use these models to make forecasts anyhow – and I can readily see the viability behind his statement that "nobody really belives in the validity of these models."

I can only further hope that a heuristic program has not been developed to make Armageddon-like judgments based on the data trends previously calculated by the stated modeling procedure.

On the other hand, I have found computers immensely useful for another purpose: the storage, computation and retrieval of information which is subject to little or no interpretation, e.g., my name, current address and earnings.

J.W. Montgomery

Kalamazoo, Mich.

Grease the Squeaky POS Wheel

The absence of price markings on supermarket items in stores with point-of-sale (POS) systems should not make comparison shopping any more difficult. In the state of Washington, unit pricing is required to be posted on the shelves, providing the best comparison technique possible.

In addition, two supermarket chains do not price-mark all items – the customer does. When entering the store, the customer picks up a grease pencil to mark the items himself. The grocery checker uses the customer-recorded prices at checkout, and the customer can thus insure than he is being charged correctly.

Surprisingly, these stores do not have POS systems, but the grease pencil system could supplement POS stores that wouldn't trust such an honorary system. So, for those consumers complaining about loss of comparison shopping with POS, give the squeaky wheel the grease pencil.

Craig S. Sullivan

Bellevue, Wash.

Letters Keep Coming

I only hope *Computerworld*'s advertising columns pull in responses as well as its letters to the editor.

CW ran my letter about forming a documentation group within the Association for Computing Machinery (ACM) [CW, Dec. 25-Jan. 1]. I have received a minimum of two letters each and every day since then from people wanting to join or requesting more information.

The total went as high as nine letters in the days when the issue first came out. Not bad for a subject as fascinating as computer systems documentation.

But the thing that really gets me is the durability. They just keep coming in, from large companies and small – throughout the country.

Thank you.

Joseph T. Rigo

New York, N.Y.

(Other letters on page 12).

Grim Reaper

We work in a young trade – young in the sense of recent, and young in terms of the age of our people. In world politics, in medicine and law, in the frozen succession of professorial chairs in European universities, one remembers death and retirement. Not so in the computer business.

I suppose the first I thought about this involved the untimely deaths of Bill Bell and Dudley Buck, oh, 15 years ago. Bill was one of the founding fathers, a demon board wirer in the '40s, a pioneer technical service bureau entrepreneur in the '50s. Dud was at MIT and saw more clearly than anyone of his time the characteristics and the potential of chip technology. His predictions of electron beam "carving" of LSI structures is only now coming to fruition.

But it is on the management side that one gets the large-scale effects of unexpected death. The sudden disappearance of a key figure throws plans awry, depresses optimism, destroys momentum. Many years ago the fresh Olivetti thrust into electronics, and the whole Elea range of computers, was set back a whole (computer) generation – indeed, almost a decade – by the *autostrada* accident which killed Mario Tchou, its chief technical man. Perhaps the sale to General Electric would never have taken place, had he lived.

More recently, the plans of GE Phoenix were very badly dampened by the death of John Haanstra. Coming from powerful IBM, he had brought new perspectives and new skills to a shaken and nervous enterprise. A plane crash swept them away.

And now an even more significant disappearance has taken place. The force behind the rise of Fujitsu, the man who harnessed the enormous surge of computer interest in Japan, Toshio Ikeda, has died suddenly in Tokyo. I knew Bill and Buck and Tchou and Haanstra. I didn't know Ikeda, so there isn't the element of pain and deep regret that comes with friendship bereaved. But I know and admire the Fujitsu effort: its independence, its imaginativeness, its vigor. The bringing over of Kaoru Ando from IBM Japan, the refusal of U.S. licenses, the link with Gene Amdahl, the interactions with the government ministries that resulted in the cooperation with Hitachi, all are outstanding in a national effort which is itself a world wonder. And Ikeda supplied the insights and the enthusiasm.

The next two or three years will be crucial for the Fujitsu-Hitachi combine. The FS announcement, the wild gyrations of "petroleum" economics, the Amdahl adventure in the United States, the entry into the Australian market, all put enormous pressures on top management. There will be demands for unheard-of development expenditures, increasing IBM competition and a great deal of national political and social change. Dr. Ikeda will be missed.

Herb Grosch

Do Cobol COMPUTEs Really Need Double Precision?

Harry S. White, the National Bureau of Standards' (NBS) associate director of Automated Data Processing Systems, will soon be faced with a decision which can hurt many users both inside and outside government.

The basic problem is that a group of government Cobol testers are having difficulty writing tests to fit the Cobol standard as written and to simplify their task, they want all users of the COMPUTE statement to use 18-decimal digit fields for intermediate results and to provide for floating decimal points.

Just how ridiculous this idea is for business language can be shown by considering that a major use of the COMPUTE statement is to compute the discount available. Computing 3% of $10 needs – according to the bureaucrats – a field for 18 figures, apparently after the decimal point, that is, $.300000000000000000.

Of course, all this really means is a great deal of wasted computation will take place and for some minis (where COMPUTE statements might well be expected to be particularly fast) writing full Cobols will become impractical, even though it will make the tester's life easy.

Technically, of course, it is clear this requirement should not be incorporated. But White's decision must be based on more than simply the technical aspect.

Problem Definition

The examination of over a dozen Cobol compilers for the purpose of validating these compilers . . . has revealed over a dozen variations in the implementation of the COMPUTE statement. This situation creates obvious problems in the implementation of audit routines. Furthermore, it adversely impacts portability of Cobol programs.

Discussion of the Issues

Two related issues are addressed in this interpretation: the accuracy of arithmetic operations and the timing and scope of the ROUNDING phrase in the COMPUTE statement. Both of these issues involve intermediate results. Specifically, the variations in the implementation of the COMPUTE statement are due in part to discord as to:

- How many decimal digits are to be provided for in the intermediate results fields.
- The behavior of the decimal point (if present) in an intermediate results field.
- The scope of applicability of the ROUNDING phrase in the COMPUTE statement.
- Whether rounding or truncation will occur to an intermediate result field.

The first two questions relate to accuracy while the latter two relate primarily to consistency.

These excerpts from the *Federal Register* show what the National Bureau of Standards is currently considering for an interpretation decision. It will be noted that the problem definition does not include any detail that defines the problem. What there is in this regard (different compilers provide different length intermediate results field, treat decimal points differently, etc.) is included in the discussion of the issues, and even there no examples of the differences are provided.

Similarly, the discussion of the issues does not contain any consideration of the impact of the proposed solution on the user or, for that matter, anything that suggests the differences are important to a Cobol user.

The real problem is whether to curb the bureaucratic tendencies and arrogance exemplified by this attempt to sacrifice users' needs to bureaucratic convenience or whether to show a strong, undivided front to the internal committee that came up with this monstrosity and which now is reviewing comments before acting as a judge on its own idea.

The Taylor Report
By
Alan Taylor, CDP

Audit Routines Needed

White has to keep together the concept of testing of Cobol compilers. The total irresponsibility of the American National Standards Institute (Ansi) and the Computer and Business Equipment Manufacturers Association (Cbema) in first promising, then prevaricating for six years and now dropping the Cobol audit routines has left all Cobol users – civilian and government alike – with a travesty of a standard which can be used to lock users in to specific compilers instead of making them hardware-independent.

And the government has stepped in to provide its own audit routines only after all others have dropped out.

Equally, the requirement for audit routines may well require some formal interpretation technique, which on the surface is to be provided by the Federal Cobol Interpretation Committee (FCIC). Turning down its first effort will not strengthen its position – a fact of which White is well aware, as he is of the fact that FCIC's position is under attack.

So, both acceptance of the 18-digit nonsense or rejection of it have major problems. Yet, in fact, it should be rejected.

My solution would be to readvertise it after correcting what is wrong with the system that produced the monstrosity in the first place.

What has really happened was that no one, not even White, checked the output of FCIC properly the first time. Looking at the publication of its recommendations in the *Federal Register*, it can be seen:

- FCIC waffled instead of providing a problem definition.
- FCIC selectively obfuscated the issues by the old technique of ignoring some and labeling rather than describing others.

Why FCIC was allowed to publish such arrogant nonsense is beyond me; although, frankly, I suspect White himself is probably responsible. What is clear is that procedures which call for a publication of the problem definition, etc., have been met no more than if FCIC had published a scrambled egg recipe.

This gives White a chance to start over again. Hopefully, he will take it.

In fact, White is interested in readers' response to these problems, concerning both the procedures and the specific items. He told me the lack of public interest is something he would like to end.

So would I, although first I think he should put his own house in order. To help you make your opinions known, there is a questionnaire.

What Do You Think?

(1) Are Cobol interpretations of standard ambiguities and omissions beneficial to Cobol users?

_____

(2) Is the problem definition illustrated adequate?

_____

(3) Is the discussion of issues adequate?

_____

(4) Do all COMPUTE statements need 18-digit decimal intermediate results fields?

_____

(5) What advice would you give to Harry S. White?

_____

Name_____ **Position**_____

Street_____

City_____ **State**_____ **Zip**_____

After completion, please return to Alan Taylor, Taylor Reports, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Letters to the Editor

Cobol END Features Helpful But Some Additions Useful

The END feature for Cobol suggested in the article, "Structured Cobol Needs 'End' Feature," [Cw, Jan. 15] would assist in the production of structured programs. There are, however, a few minor additions which would be useful.

When reading a record from a file, it is necessary to provide an imperative statement for the AT END or INVALID KEY condition. There is at present no method of terminating the imperative statement without the use of a period.

Here again the END statement would be useful, although it may result in ambiguities since the word "AT" is optional.

Thus, for example, IF condition statement-1 ELSE READ file name END END END statement-2, etc. would then be legal Cobol.

Other Cobol statements where the END statement would be useful are ON SIZE ERROR and NOTE.

Another example of the inadequacy of Cobol for structured programming is the requirement that each of the subroutine call statements (ENTER LINKAGE, CALL and ENTER COBOL) must be followed by a period. This makes it impossible to call an external subroutine directly within the scope of an IF statement.

Another possible change would be to replace GO TO . . . DEPENDING ON by PERFORM . . . DEPENDING ON identifier. This would ensure that each performed routine would return to the same point after execution.

A number of letters have been printed recently concerning "smart" cross-reference programs. The following are the options I would consider useful for cross-reference listings:

- Having a list of unreferenced data names printed together with the line definition numbers.
- Full cross-reference.
- Listing only those data names which are defined outside macro expansions.
- Listing all except those data names that are defined and referenced entirely within the same macro expansions.

But then perhaps I am biased, since my experience is based mainly on Univac's OS/4 operating system where the mandatory standard Equate macro produces anything up to about 1,200 data names, the great majority of which are referenced only within the macro itself. The effect on a normal cross-reference listing is quite dramatic; hence, I suggest the last option described above.

Another topic debated recently is the Assembler vs. high-level language controversy. I believe part of the blame for inefficient high-level language programs can be placed on the absence of easily assimilated information on the relative efficiency of the various language constructs.

I can see no reason why each particular installation has to find out which constructs should be used and which should be avoided if possible. Surely, the computer development team must have this information available and be able to disseminate it in an understandable format.

Arne Rohde

Struer, Denmark

PCS Not A Better Measure

Roger Harpel's article, "Control Better Than Code Count" [CW, Jan. 22], missed the point of the original article, "Raw Count of Instruction/Day May Reward Poor, Not Good Code" [Cw, Aug. 21].

Programmer productivity and project status are not the same thing. Instruction counting is an objective measure of productivity and, however poor a measure it may be, to date it is the only objective one we have.

Harpel has forgotten the decision-making process the data is supposed to support, and so he has ceased asking whether and how any given fact would be useful in that process.

Under a program control system (PCS), I would work with the knowledge that every little boo-boo I make is being recorded for my manager's edification. Computer people are just beginning to show a healthy concern for protecting personal privacy against invasion by users of computerized data bases, and it is discouraging to see Harpel headed full steam in the other direction.

Instruction counting does not encourage a programmer "to maximize the number of instructions in a finished program." There is a point beyond which increasing the length of a program stops speeding up development and starts slowing it down. And any programmer knows he'll look better completing two 1,000-line programs a month than completing one 2,000-line program – assuming both programs work.

The worst that can be said for instruction counting is that it does not encourage a programmer to minimize the number of instructions in a finished program. It is not clear to me that is a bad thing.

On the other hand, a PCS would encourage programmers to minimize the number of runs used on a project. The most elastic part of the project cycle is testing, and that is where the most minimizing would occur.

Hardware is cheap and getting cheaper; software downs are not cheap at all. Limiting test runs is, thus, a false economy. If anything, a programmer should be encouraged to maximize testing.

The "size" of a project is related more to the number of data items and loops involved than to the raw instruction count.

We must refine tools like these. "Improved visibility of the program development cycle" won't help us much until we know what we want to make visible and what to do with it when we see it.

Jonathan Sachs

Chicago, Ill.

An Inconsistent Showing

Recently my wife and I went to a boat show in the New York Coliseum. On the first floor, we found a computer which, when we told it the kind of boat and price we were interested in, supplied us with the booth numbers we should visit.

Curious, because just a few months ago we went to a computer show in the same coliseum. We not only didn't find a computer to direct us to the equipment we wanted to see, the guide book for the show wasn't even indexed. After trying to cover the show on foot, we gave up and spent 40 minutes straining our bifocals to read through all the small type in the book to find the booth numbers of exhibitors who had what we were looking for.

Next year we expect to go back to the computer show and find a boat in the lobby. It will be equipped with a navigator who can locate the booths we want.

Daniel J. Carson

Baldwin, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

'PAC II' Eases Project Control

KING OF PRUSSIA, Pa. – International Systems, Inc. has combined the capabilities of its PAC I and Auto/Plan packages to provide, in PAC II, a project analysis and control system that starts earlier in the project life cycle and goes into more detail than most apparently similar monitoring systems.

PAC II will handle budgeting, planning, simulation, scheduling, control and, finally, accounting of any multiphase project.

It can be utilized to monitor DP projects, but is not limited to that area of a using organization's operations, an International spokesman said.

From Auto/Plan, PAC II picks up the ability to accept lists of activities and events, developing from them optimum plans based on priorities of projects and activities, dependencies, resource availability, restraints and effectiveness as defined by each user.

Statistical plans for each activity, milestone or project, time-scaled Gantt charts and regression charts for resource, equipment and project time and costs are generated.

The PAC I features brought into PAC II include reports of actual times and costs of tasks within phases of a project and summaries at the phase and overall project levels. Reports are generated for the various levels of management.

Output includes loading and scheduling of staff, overall analysis of costs and time of each project, more detailed analysis of each task and history reports.

The system is geared to helping the user spot additional time and costs required by changes made before and during the project development cycle as well as after the initial development is complete.

Written in ANS Cobol, the package runs on any system with 100K memory and a standard compiler. PAC II can be acquired for a one-time charge of $16,500.

International Systems is at 150 Allendale Road, 19406.

'Reverse Assembler' Recovers Programs

LOWELL, Mass. – Users of Digital Equipment Corp.'s PDP-8 minicomputers now have the possibility of recovering Assembler source code even if original program listings have been lost by utilizing a reverse assembler from Graphic Systems, Inc.

Working from machine code stored in main memory, this utility creates quasi listing and source tapes which show the logic paths of the program.

The reverse assembler runs in an 8K PDP-8 and is available on paper tape for $100 from Graphic Systems at 217 Jackson St., 01852.

Keeping IBM Trials in 'Context'

By Don Leavitt
Of the CW Staff

GREENWICH, Conn. – By mid-March, IBM-watchers will be able to scan through an on-line data base of materials related to both the Justice Dept. and Telex anitrust cases.

The service is being brought up on the Boeing Computer Services (BCS) remote-computing network under the terms of an agreement recently signed by Base, Inc. of New York and International Business & Data Services, Inc. (IBDS), headquartered here.

The documentation/information service is offered to "qualifying" DP users and vendors, and that "probably should include everyone – except IBM," an IBDS source said.

The service is, in fact, an extension of a marketing agreement which currently provides the data bank material in printed form to qualifying corporations under a licensing agreement.

IBDS has developed a series of four-color hierarchical charts covering various aspects of the antitrust complaints and IBM's operations. These charts and the Context retrieval language capability recently installed on the BCS net by Base should help users find their way through the mass of data "quite quickly and easily," IBDS said.

It is anticipated that more than 50,000 selected documents, amounting to more than 500,000 pages, will eventually be entered into the on-line system, with about 200,000 documents (1.5 million pages) on the off-line batched system, the spokesman said.

The fee structure will be based on a graduated yearly sponsorship fee reflecting the user corporation's size and anticipated depth of use of the data base. The sponsor fees will run from a low of $500/year to more than $25,000/year.

Machine time on the BCS net will be separately priced, IBDS noted.

IBDS is at 22 Greenwich Plaza, 06830.

Chasing Capacity–Part I

Bank Reconciles User, DP Staff Views

By Charles B. Gibbs and
Melvin J. Strauss
Special to Computerworld

For some time now, we have been looking at problems we face in improving the effectiveness of DP from two points of view, that of management and that of the professional. With the techniques described below, we at Chase Manhattan Bank are beginning to bridge the traditional gap between the two.

DP operations were considered unresponsive to new systems. Users felt service was bad, existing systems couldn't be handled and changes made things worse. Overall, we heard them saying, "You cannot be relied upon to satisfy our needs."

In contrast, the operations managers felt they were providing good services, but they also felt users' requests were unrealistic and user input was late or defective. In short, they believed users were creating their own service problems, and both personnel and hardware capacity were being pushed to their limits.

While the bank was looking for more capacity, the projected work load (measured in megabyte-hours) was only 40% of existing capacity. It was difficult to explain to senior management the desire for additional capacity when actual megabyte-hour usage was that low.

Our first efforts to improve our operations relied on measuring internal system activity and balancing channel loading, optimizing the operating system and eliminating underutilized equipment. This enhanced capacity utilization by a few percent and reduced annual equipment rental expenditures.

But all computer performance measurements were expressed in DP jargon – core hours, channel loading, I/O traffic, etc. While meaningful to DP types, it did not facilitate communication with senior management, who couldn't understand the causes of the problems of the shop.

We then changed the direction and scope of our efforts and set objectives to respond to what we believed senior management needed. First, we wanted to be able to describe capacity, demand, service and effectiveness in terms all would understand.

Second, we believed it was necessary to provide economic valuations on all these items so we could give the true cost of providing DP services for specific corporate products and relate these costs to service risk for management decisions.

To quantify capacity and its usage to meet these two objectives, we measured capacity utilization, service level/service risk and the impact of demand on capacity according to the way demand is scheduled by operations personnel.

Appropriate terms, the schedulers said, were number of tape drives, disk drives, bytes or words of core and CPU percentage over time – not reels of tape, cylinders or numbers of records, megabyte hours, etc.

After definition of demand and capacity, we needed their quantification. We asked the questions: "How much capacity do we have relevant to our needs?" and "When and how do we have to use it?"

'DP Service Agreement'

One of the major building blocks of what we now call the Production Control

(Continued on Page 14)

Simple Edit Masks for Printout Encourage Fortran Business Use

ARLINGTON, Va. – Fortran installations can print financial and related output in a commercially edited format with a subroutine now available from Cyberdynamics Training Center.

The package accepts edit masks in the same format as Autocoder or similar languages – including spaces where digits may fall, the placement of commas and decimal points where they should be and an indicator of how far suppression of high-order zeroes should be allowed to continue.

This avoids the difficulties inherent in creating and maintaining masks built around hexadecimal characters, such as those needed in IBM 360 Assembler language editing, the vendor noted.

A floating dollar sign or other protection symbol can be specified to prevent the unauthorized insertion of digits which can increase the dollar value of checks or financial documents.

The edit routine also allows the use of any symbols devised by the user for credit and debit, including the conventional CR or minus sign, and these may be used at either end of the mask.

The subroutine logic appears to support the use of masks entered as parameter cards at execution time, which shape the operation of the edit routine that can be cataloged in the user's system library.

Multiple masks can be read in and used with the routine during a single program execution Cyberdynamics said.

Although the basic edit routine is designed for commercial use, separate versions which will handle real numbers and double precision numbers are available.

The package leases for $55/mo for 24 months or sells for $1,200, according to the company, which can be reached through P.O. Box 2661, 22202.

Service Contract Clarifies Goals, Equipment Needed

(Continued from Page 13)

System is the "data processing service agreement," a very simple (but detailed) tool which performs three functions.

First, it specifies to the user when, under normal input conditions, he can expect to receive his reports at a specified service level, i.e., up to some threshold input time and input quantity (reels of tape, cards, transactions or whatever else is meaningful to both parties).

Computer operations agrees to deliver the user's output at a specified hour of the day some percent of the time (e.g., all products will be delivered at 10 a.m. on 90% of the days the user complies with the previously outlined input arrangement).

Second, the contract specifies the types and quantities of computer resources required to produce the user's product. This may be one hour of 100K bytes of core, 10% of available CPU cycles, one tape drive or whatever entities line management requires to adequately schedule and reserve sufficient computer capacity.

This often reflects predecessor/feeder relationships with other applications or corporate products.

Finally, the contract states in advance what actions both parties should take when the above commitments cannot be met. This often includes respecifying output deadlines, instructions to process without certain inputs or merely the phone numbers of responsible members of the organization to contact for further instructions.

The contracts, then, remove much of the uncertainty of service commitments faced by DP line managers. Taken separately, they quantify the individual segments of demand; taken in total, they quantify overall demand faced by line managers.

The signatures of key senior members of both DP and user management help establish an illuminated service environment, free from the corporate dangers of guesswork and misunderstandings.

Or, if all else fails, the contract provides a shield with which to explain past actions.

We also believe it is necessary to describe present and forecasted future capacity/demand positions of computer operations so senior management is forewarned of potential capacity acquisition decision points. These decisions may involve enlarging existing computer utilities, establishing small dedicated facilities or even delaying implementation of new applications.

We present the capacity/demand position in terms of one critical resource that typifies computer system loading. Usually that resource is core or CPU, depending on the nature of the computer system being described (virtual, nonvirtual, etc.).

As escalation of demand is mapped, we relate to senior management the different levels of risk associated with higher and higher capacity usage.

In their next article, Gibbs and Strauss will outline the various ranges of capacity that are available or unavailable to the user, the risks in moving into these ranges and what the user can do to reduce those risks.

Gibbs is a vice-president of Chase Manhattan Bank N.A. and manager of the Production Planning and Control Division of the bank's Operations Department. Strauss is assistant treasurer and manager of the bank's Computer Capacity Planning Department.

RTS/8 Offered For PDP-8 Use

MAYNARD, Mass. – A compact, real-time system for Digital Equipment Corp.'s (DEC) PDP-8 minicomputers, RTS/8 is based on a 700-word executive routine that controls the overall execution and interaction of tasks.

Its functions include scheduling, startup and suspension of tasks and the passing of information between them, a DEC spokesman said.

A minimum configuration utilizing RTS/8 could easily be contained in 4K of main memory, he added. Expansion to 12K words, however, would allow full foreground/background operations, with both event-driven and batch processing running concurrently.

Requires OS/8

RTS/8 requires OS/8 for system generation but includes modules to work with OS/8 files and to do OS/8-type background processing without the full operating system being in place.

Other standard modules – user selectable at system generation time – include linkage to the console, disks, printer, magnetic tapes and other peripherals to terminals; and linkage to internal facilities such as an elapsed-time clock and restart mechanisms.

RTS/8 can control as many as 63 tasks on a fixed-priority basis, DEC said, adding that tasks may reside in memory or on a mass-storage device, to be swapped in only as required.

RTS/8 is priced at $500 for single-use licenses. RTS/8 and OS/8 are package priced at $750, the DEC spokesman noted.

'APL.SV' on Net Adapted to 360 Use

TRENTON, N.J. – Subscribers to the APL Services, Inc. remote-computing network can transfer information between interactive APL programs and batch-oriented programs in other languages with a series of enhancements for IBM's "shared variables" APL release.

The same enhnacements, now capable of running on IBM 360 as well as 370 equipment, can be leased as a package from APL Services for installation on large in-house systems, the vendor added.

APL.SV first became available from IBM in May 1973 on a "request-for-price quotation" basis. Designed to support data swapping under an originator-authorized user arrangement, it included 370-type instructions which blocked its use on 360 CPUs.

On APL Services Net

The enhanced APL.SV is available on the APL Services network, with charges based on resources used. The in-house version can operate on a Model 50 or larger 360 or on a 145 or larger 370.

The package can be leased for $1,000/mo, the vendor said, adding however that the APL.SV processor from IBM must also be in place to support the enhancements.

APL Services is at 684 Whitehead Road, 08638.

Claims It Will Suffer 'Irreparable Injury'

Datran Motion Asks Court to Stay Approval of DDS

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The Federal Communications Commission (FCC) decision to allow AT&T's Dataphone Digital Service (DDS) to begin operations will affect the ability of the Data Transmission Co. (Datran) to provide "new and innovative digital communications services to the public."

This was one of the claims made by Datran in a motion to stay the FCC decision. Datran filed the motion in the U.S. Court of Appeals, explaining it would suffer "irreparable injury" if the approval of AT&T digital service is allowed to stand.

Unless the court overturns the FCC decision, Datran will have to reduce its rates by about 40% to compete with the DDS rates or it will have to hold its present price line and lose customers, the Datran motion said.

"It would be ironic if the [Datran] service were to be lost to the public as a result of the commission's ill-considered action granting AT&T authority to construct and operate the Data Under Voice (DUV) facilities to offer DDS," the motion said.

Datran called the FCC's DDS approval "a casebook example of a decision which does not meet the well-established judicial standard for reasoned administrative decision-making."

In commenting on the two-tier pricing system which the FCC established for DDS, the motion said the commission failed to assess the anticompetitive impact of authorizing initial construction of the five-city DUV facilities, authorizing operation of these facilities once they were constructed or authorizing construction and operation of the 19-city DUV facilities under the "public convenience and necessity" standard.

This failure is a violation of the Communications Act under which the FCC operates, the Datran motion said.

Before authorizing construction of the DUV facilities to be used for the DDS service, the commission "patently failed to make findings and conclusions required in the public interest," Datran charged.

The FCC has twice refused to come to grips with the serious and substantial allegations made about AT&T's anticompetitive purpose and conduct in filing its DDS applications, Datran said.

Under the FCC ruling, Bell now provides DDS in five cities. It plans to begin service to the first of 19 additional cities by mid-1975. It has been required to set rates 40% higher in the 19 cities compared with the rates it is charging in the five cities.

Variety of Terminals Aids Firm In Diversified Order Processing

STRATFORD, Conn. – A variety of terminals help Warner's Division of Warnaco, a woman's clothing company, process several types of orders.

The company uses a Mitron Systems Corp. MDRS-9 to receive orders from Sears, Roebuck & Co. or other customers over dial-up lines. The terminal generates a magnetic tape which batches the received data.

The tape is then transferred to a Data 100 Model 78 remote batch terminal which transmits the information to the firm's IBM 370/145 mainframe in Bridgeport.

When the CPU processes the orders, the open order file is updated and a picking statement which will be used at the warehouse here is generated. This information is spooled back to the warehouse, where the picking statements are printed out on the Data 100 terminal.

The printed picking documents are used to locate the goods in the warehouse and pack them for shipment, according to Howard Gorham, vice-president of information and merchandising systems.

The Mitron terminal also is interfaced to a Model 33 ASR Teletype. A paper tape is prepared off-line on the Model 33, then entered into the Model 33 where the information is recorded on the CPU-compatible tape mounted on the MDRS-9 terminal.

The Mitron terminal is then used to send order confirmation, shipping schedules and other related information back to the customer that originally entered the order.

Despite the manual handling of the tape, answers are usually transmitted back to the customer about the status of the order on the same day the order is received, Gorham said.

The Mitron terminal is also used to receive finished goods information from Dothan, Ala. and raw material information from Thomasville, Geo.

Terminal Transactions

Once each day the Mitron terminal is switched to a 750 bit/sec rate setting, thereby conditioning it to accept incoming traffic through a Bell 402 data set. This traffic originates at Warner's Thomasville plant, which performs cutting operations for all the factories in the Warner's complex.

Material usage, shipping records and a weekly "want list" are compiled on a paper tape terminal writer. The resultant punch paper tape record is transmitted by a Tally terminal over out-Wats.

The Thomasville plant ships its output to the Warner's stitching plants, most of which are located offshore. The completed garments then travel from the

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Study Says All-Digital Services To Be Widespread in Three Years

By Ronald A. Frank
Of the CW Staff

CAMBRIDGE, Mass. – All-digital communications services will come into widespread use within the next three years, according to a report by Arthur D. Little, Inc. (ADL).

The predictions about data communications services are included in an ADL study titled "Business Communications 1975-1985," available from the research firm.

One of the major spurs to digital service growth is the recent Federal Communications Commission (FCC) ruling which gave AT&T conditional approval to begin its Dataphone Digital Service (DDS), according to Dr. Martyn Roetter, one of the report's authors.

This authorization requires the phone company to provide digital local loops to specialized and other carriers, which should encourage new digital services for data users, he said. Up until now the costs of non-Bell carriers have been inflated because they have had to rely on analog local loop facilities, he explained.

Such companies as Data Transmission Co. (Datran) and Southern Pacific will benefit from the use of digital local loops, Roetter predicted.

As high-capacity, low-cost digital transmission lines become available, they will give a favorable boost to the packet-switched carriers. As their line cost decreases, the cost of their service to the user will also decrease, he said. The insurance industry user will benefit from packet-switched services, the report said.

The cost and services available to private-line users will continue to improve and these users should also benefit.

On the other hand, basic telephone service will probably increase in cost, the report said. Private-line rates have already dropped through the introduction of Bell's high/low density tariff and ADL sees further reductions in long-haul services over 1,000 miles.

One factor in these decreasing costs is the emergence of domestic satellites which have a lower cost over the longer distances, Roetter said. As costs continue to drop, some users may begin to operate in on-line mode with applications that previously were effective only in batch mode.

The rates for digital service are substantially less than private-line charges, Roetter said. AT&T's DDS rates between New York and Chicago are 65 cents per circuit mile per month, including the long haul and local distribution charges at 2,400 bit/sec. A 4,800 bit/sec line along the same route would cost about 94 cents per circuit mile per month.

These rates can be compared with high-density tariff rates between the same two cities, which are $1.02 per mile per month, he said.

But one of the important criteria that has not yet been resolved is the way in which AT&T will be allowed to base its rates in competitive services. Until this question is resolved by the FCC, these types of comparisons are tentative and subject to upward revision, he said.

As a general rule, Roetter said, users can expect higher reliability at lower cost for the longer haul private-line service. Most of these benefits will go to the larger data communications users with long distance networks.

An exception may be in the larger, urbanized states such as California where intrastate users may get in-state high/low density plans that provide similar reductions in prices.

There are now very strong pressures on the FCC which are likely to lead to a certification program to replace the presently required access arrangements, Roetter predicted. This program would make it possible to interconnect a certified data communications unit directly to telephone company lines without any type of coupler and its associated charge.

This should make noncarrier equipment less expensive to the business users, he said. And this type of benefit would apply to both large and small users.

The full ADL report, which deals with all types of telecommunications services, is available from ADL at 25 Acorn Park, 02140 for $1,000.

Terminal Variety Aids Diversified Order Processing

(Continued from Page 15)

stitching operation to the finishing plant in Dothan.

At Dothan the final touches are given to the garments – bows, lace, furbelows. The completed garment is inspected, tagged and boxed, then trucked to the Warner's distribution warehouse here in Stratford.

Along with a shipment the truck carries the paper tape terminal's punch tape listing of the items on its manifest. This paper tape is converted into magnetic tape on a auxiliary paper tape reader on the MDRS-9 for merchandise entry to warehouse stock records.

A Bell Type 5 Dataspeed transmitter terminal is installed at Dothan. This unit is on-line and transmits the paper tape terminal's tape data to the MDRS-9 as soon as it is prepared.

Shipments from Dothan can be preassigned during the two-day period required by the truck to make the run north. One of Warner's out-Wats lines at Stratford is switched over at night to the MDRS-9 for this application.

Transmission of the paper tape from Dothan leaves the MDRS-9 with one other paper tape-to-magnetic tape conversion job. Accounts payable records are posted on an NCR accounting machine which produces a punch paper tape record for entry into the Model 145. This paper tape is processed by the MDRS-9, saving the cost of special paper tape conversion equipment, Gorham said.

The Data 100 terminal is used as a remote job entry terminal to do all divisional work including inventory control production control, manufacturing, accounting, etc. The terminal is operated on a three-shift basis each day. Some of the data transmitted to the 370/145 is prepared on keypunches and the cards are then entered into the terminal's card reader.

The firm also utilizes a Key Batch entry system interfaced to the Data 100 terminal.

The company is slowly evolving toward a data base system with which it will use small CRTs for inquiry purposes directly into the 370/145, Gorham explained.

Terminal Transactions

Western Union Terminals Have Dual Uses, 30 Char./Sec Speed

MAHWAH, N.J. – Computer terminals that work at up to 30 char./sec for remote data entry, time-sharing and similar applications are now available with an added capability for TWX communications at 10- and 15 char./sec from Western Union Data Services Co.

Data communications users operating at up to 30 char./sec over the dial-up telephone system can access the TWX teletypewriter network and international communications networks.

The following Western Union Data Services terminals are available in the new TWX configuration: EDT 33 ASR/MSR, EDT 300 ASR, EDT 300 KSR/MSR and EDT 300 AST/MSR, equipped with DSC Originate/Answer Datasets having automatic answering capability.

The EDT 300s are basically 30 char./sec terminals. With their MSR tape cassette buffers they can print at 10-, 15- or 30 char./sec and transmit at up to 30 char./sec.

The EDT 33 is a 30 char./sec unit which transmits at up to 30 char./sec through a cassette buffer. Both terminal families operate on the regular dial-up telephone system.

When the terminal is connected to the dial-up network it functions as usual, the vendor said. When it is switched to the TWX network it becomes a TWX terminal capable of transmitting at 10- or 15 char./sec to other EDT 33s and 300s equipped for TWX and to other TWX terminals at 20 char./sec, the standard TWX speed.

Besides dual-use operation and 15 char./sec TWX capability, other features of the new terminals are:

- Automatic answering so either TWX or regular dial-up transmissions can be received when the terminal is unattended.
- Speed restraint so Western Union Data Services terminals operated in the TWX mode can communicate with slower international Telex terminals.
- Fully electronic TWX circuitry.
- Single answerback for both TWX and dial-up use.

The price for a TWX access arrangement adds $25/mo and the restraint option adds $5/mo to the terminal cost. First deliveries are scheduled for the second quarter.

Western Union Data Services is at 70 McKee Drive, 07430.

Syntech Clustering Unit Requires Fewer Modems

ROCKVILLE, Md. – A terminal clustering unit has been added to the product line of Syntech Corp.

The CLU-8 enables a single modem to service up to eight terminals, thereby reducing the number of modems and transmission lines normally required in such multiple terminal applications.

Several CLU-8 units can be cascaded to extend the service range of a single modem to cover an "unlimited" number of terminals, the company said.

The CLU-8 provides automatic protection against terminal malfunctions during a data exchange and is capable of fully automatic, unattended operation requiring no maintenance or adjustments, it added.

Said to be data transparent, the unit is fully interlocked to ensure that only one terminal at a time gains access to the central computer. Front panel indicator lamps display the status of modem interface signals and identify the terminal presently having access to the central computer.

The CLU-8 costs $895 on a 30-day delivery from 11810 Parklawn Drive, 20852.

Dear Computerworld:

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- ☐ SKEPTICAL
- ☐ ANGRY
- ☐ PLEASED
- ☐ INVOLVED
- ☐ AWARE
- ☐ CURIOUS
- ☐ EXCITED
- ☐ DEMANDING
- ☐ FURIOUS
- ☐ INFORMED
- ☐ SURPRISED

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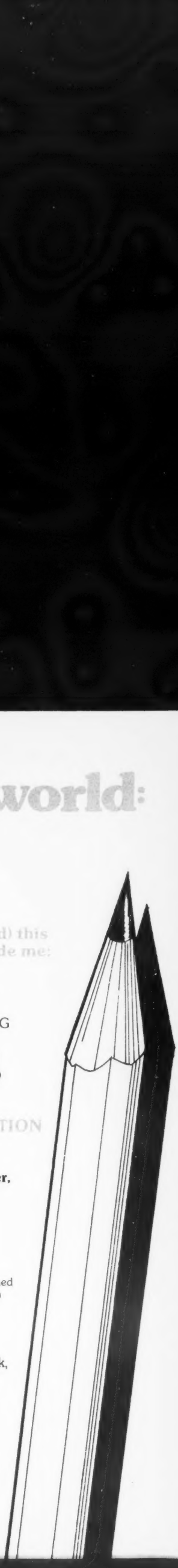

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50 Wholesale/Retail Trade
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85 Government - Federal/State/Local
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Hello, IBM.

ADDS introduces the first truly low cost CRT terminal for the IBM user.

We've been waiting a long time to say this:

Hello, IBM!

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You see, IBM (we almost feel like we should call you "sir") Applied Digital Data Systems (that's us) now has a terminal for IBM users. Wait'll you see it.

It's called the 980A. And, it's packed with the features that helped ADDS carve a reputation in the Teletype® compatible market. Sharp, readable screen with upper and lower case character display. Line as well as character insert/delete. Not to mention blinking, formatting, and patented graphics.

Compatibility?

The 980A looks just like a 3270 to the telecommunications access method (BTAM, TCAM, etc.) and to such real time monitors as CICS. It can even operate on the same phone line as 3270's.

However, since your 3270's don't have blinking, lower case, graphics (or most other special 980A features, we might add), applications software developed to support the 3270 won't support our 980A. So we don't think we'll be replacing many of your 3270's.

But, the IBM user can develop new applications around the 980A. And the reason we think he should (here's where you get nervous again) is quite simple. The 980A offers unmatched features at an extremely low cost. Namely, $3200.00 to purchase, $90.00* a month to lease.

And all of our units are serviced by NCR.

That's pretty much why we think if our shoe fits, the IBM user's going to wear it.

Because even though you're very, very good, IBM, there's always room for a little improvement.

Sir.

Hello, ADDS.

I may have a new application for your 980A. Please send additional information.

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Applied Digital Data Systems Inc.
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*3 year lease-purchase not incl. [illegible]

Terminet 30 Has 30 Char/Sec Speed

GE Adds Modular Terminal, Teleprinter

WAYNESBORO, Va. – General Electric (GE) has introduced a 30 char./sec terminal and a 180 line/min teleprinter to its Terminet line.

The Terminet 30 features modular components that make it possible for an operator to replace a print head in several minutes and perform other maintenance functions that normally would require outside assistance, GE said.

The terminal will be available in keyboard send-receive (KSR) and send-receive (SR) models initially, but later this year GE intends to add models with single or dual Philips-type cassette storage. A paper tape model is also planned.

The teleprinter transmits data at 110-, 200-, 300- and 1,200 bit/sec but the top printing speed is 300 bit/sec. A buffer (cassette storage) is required when higher speed transmissions at 1,200 bit/sec are to be printed, GE noted.

The serial asynchronous terminal can generate the full 128-character Ascii code set and it can operate in either half-duplex or full-duplex mode.

Code formats are implemented in read-only memory (ROM) circuits and the terminal can be modified to operate under Ansi, APL, Ecma or "nationalistic" font standards. An Ebcdic version is expected to be introduced soon.

The terminal prints an expanded 5 by 7 dot matrix character which is described as equivalent to a 7 by 9 matrix. It prints 10 char./in. on an 8-character line with six vertical lines to the inch.

An optional 132-column pitch is available. The unit prints up to four-part forms on 9-in. paper.

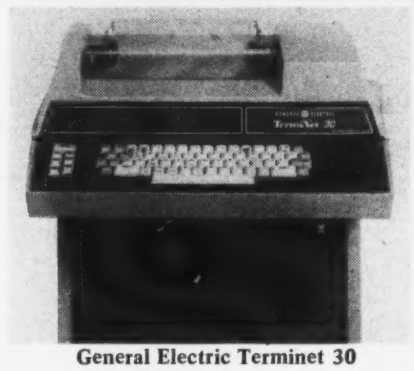
Terminet 120

Also introduced was a 120 line/min teleprinter that provides an optional 180 line/min with upper-case characters only. The slower speed applies to both upper and lower case printing.

The teleprinter can be interfaced to a variety of terminal systems, including the Bell Dataspeed 40, through a serial synchronous interface.

In addition, the teleprinter can be connected to Hazeltine, Bunker Ramo, Hewlett-Packard and other display terminals.

The teleprinter handles Ascii code and is designed to fill the gap between serial printers and high-speed line printers in such applications as intelligent terminals, remote batch terminals and CRTs.



General Electric Terminet 30

The Terminet 30 KSR model costs $1,685 while the SR model is priced at $1,481. Options such as a numeric cluster at $50 and an RS-232 interface priced at $100 are available. The terminal can also be equipped with a built-in modem.

The 80-column version of the Terminet 120 costs $2,917 while the 120-column unit is priced at $3,307.

Terminal Transactions

DSE System Designed For Use in Factories

ANAHEIM, Calif. – Data Systems Engineering, Inc. (DSE) has introduced the Model 2801 data collection terminal system designed for factory environments.

The 2801 can operate as a monitor in product movement, entry/exit control and other applications where data is collected by means of a badge-reading capability.

The terminal can operate on most types of wire connections in local mode. For remote usage, a four-wire, half-duplex private line is required.

The 2801 can transmit data up to 9,600 bit/sec in Ascii format and up to 63 terminals can operate on one line in a polled operation. The terminal can be interfaced with a General Automation SPC-16 and interfaces for other minis could be provided, a DSE spokesman said.

Software for the terminal includes the Data Collection Access Method (Dcam), a collection of programming modules providing an adapter driver, terminal handling and data transfer functions. Input to the 2801 can be punched badge or card in 10-, 22- or 80-column format in Ascii, binary or Hollerith format. The unit has a 16-character LED display and a 28-key keyboard. Thumbwheel switches and function I/O switches are optional.

A typical configuration, including a receive option for ACK/NAK control, badge reader, keyboard display, 18-function key I/O thumbwheel and time clock display, costs about $7,000 with maintenance. A three-year lease would be 3.6% of the price, and a five-year lease would cost 2.54%, the spokesman said.

DSE, a subsidiary of General Automation, is located at 1620 East Ball Road, 92805.

IMS Multiplexer Unit Lets Wang 720s Share Eight Disks

SAN LEANDRO, Calif. – Up to eight Wang 720 programmable calculators can now share one or more disks with a multiplexer/communications system available from IMS Associates, Inc.

The system consists of a line interface unit (LIU) associated with each 720 in the network and a multiplexer connected to one or more disks. A single multiplexer can be connected to as many as eight LIU's and eight disks, IMS said.

LIU's and 720s can be cable-connected up to 2,000 feet from the multiplexer. The system supports the same data transfer rates between terminal and disk as that achieved by direct interconnection, the vendor added.

The multiplexer is priced at $3,900 and each LIU costs $2,900 each. IMS is located at 1298 E. 14th Street, 94577.

A Look at Tape Drives – Part 3

Handling: the Biggest Bottleneck at Large Centers

By Vic Farmer
Of the CW Staff

As users develop larger and larger applications that depend on updates to ever-increasing data files stored on more reels of tape, the simple task of loading data into the CPU from tape can actually form a bottleneck to effective system utilization.

The problem is not simple to solve . . . pulling tapes from the tape library, mounting and dismounting them, even the simple logistics of having the right tape on the right drive at the right time require dedicated concentration as well as advanced planning from the operations staff.

A recent study of the Data Management Center (DMC) at the Department of Health, Education and Welfare, for example, delved into a measurement and analysis study of the center's batch processing capacity.

The study revealed the most significant limitation on the center's capacity is the inability to keep pace with the requests for mounting tapes and disks.

Two-Fold Purpose

The purpose of the study, reported in the center's technical information bulletin, *Feedback*, was two-fold. DMC wanted to develop and test system models which would be useful in evaluating configuration requirements for the future, but also to find out just how its present systems were running.

DMC used both a hardware monitor supplied through the Federal Simulation Center and a software monitor developed by its own staff. By combining the results from the hardware and software monitors, as well as System Management Facility (SMF) data generated through the operating system, the center was able to form a good picture of its operation during 15 selected periods totaling over 45 hours of operating time in a two-week period.

The collected data was studied and DMC estimated possible improvements with four proposed alternatives:

For each % change in workload/performance characteristics . . .	. . . overall batch processing capacity improves by . . .
Decrease in average mount demand. Increase in mount speed	.63%
Decrease in average CPU demand. Increase in CPU speed	.27%
Decrease in average EXCPs. Increase in channel speed	.13%
Decrease in average core requirement. Increase in core available for batch	.03%

The study indicated the effect of tape and disk mount requests was quite pronounced. Even when jobs which required no mounts were included in the job stream, "almost 60% of the elapsed time spent by all jobs in execution is actually spent awaiting tape and/or disk mounts."

DMS, by the way, estimated that with its present staff and operating protocols it can mount a maximum of about 1,700 tapes and disks per working day.

"While some improvement in the speed of mounting operations may indeed be possible, the magnitude of the difficulty suggests that additional innovative approaches in the management of on-line storage, design of operating system protocols, changes in the algorithm to reflect cost of mounting, etc., will be needed," DMC concluded from the study.

So far the center had identified the tape-handling problem, but corrective action is still being studied.

Solutions Vary For Tape Handling Problems

Users have tried myriad methods to solve tape-handling problems . . . some installations issued razor blades which were used to quickly slice off tape mount instructions by operators, then ran into the library, found the tape and mounted it . . . other users install public address systems so the console operator can bark tape requests to his fumble-fingered assistants . . . one widespread installation studied the alternative of issuing roller skates . . . and, in another case, users installed teletypewriters in various parts of the tape library to get requests filled as quickly as possible.

But many of these measures are symptomatic of a more general management problem: the speed and technology of the computer system have outpaced human tape-handling technology.

One of the quickest solutions is simply to convert to higher density tape drives with the current practical limit at 6,250 bit/in. The conversion from 1,600 bit/in. to 6,250 bit/in. tapes, for example, generally gives multireel file users a 50% to 60% reduction in tape mounts required, even though the higher density reels store three times the information.

Another method of cutting out confusion in tape loading is to install a tape mounting display and control system that uses a small minicomputer attached to the CPU to relay messages to the tape library.

A by-product of this system is mounted displays on the top of each drive that call out the identification number of the reel to be loaded. While this method is not completely foolproof, it is quieter than a public address system and provides an opportunity to check reels directly before loading.

Scientific Measurement Systems, at 26 Olney Ave. in Cherry Hill, N.J. 08003, was one of the first vendors to install this kind of tape mounting control system over a year ago. The system can handle up to 128 tape drives spread out over four CPUs, and a typical system for 25 drives would cost about $1,000/mo.

Genesis One Computer Corp., at 300 E. 44th St. in New York 10017, offers a similar product.

Installations can also benefit from software packages designed to eliminate library fiascos. The Epat Data Set Catalog System, from Software Design, Inc. at 880 Mitten Road in Burlingame, Calif. 94010, for example, works for most DOS-oriented centers by providing automatic volume recognition which allows operators to mount tapes on any available tape drive.

Every tape, in addition, is maintained in a disk catalog of use, contents, and quality. Epat rents for $180/mo.

A series of programs from University Computing Company (UCC), 7200 Stemmons Freeway, Dallas, Texas 75247, on the other hand, is said to capture a wide range of information during program execution.

The UCC One Tape Management Software eliminates data destruction through inadvertent job control language (JCL) or operator overrides. It also eliminates the use of external labels and maintains a tape inventory of active tapes, scratch tapes, tapes due to be scratched and tapes with expiration dates over a year away.

UCC One consists of up to 30 programs and is priced from $350/mo.

Gulf Oil Computer Sciences, Inc., P.O. Box 2100, Houston, Texas 77001, offers larger installations its Tape Library Management System (TLMS). TLMS works on-line to keep an inventory of active tapes. Gummed labels can be automatically printed at volume unload time.

Off-line batch programs are said to automatically release data sets under user control and keep various inventories in multicomputer configurations. Components of TLMS can be licensed at prices ranging up to $7,000.

Perhaps one of the more widely accepted systems is Memorex's Tape Management System (MTMS), which is free to users who agree to purchase a year's supply of tape and disks from the firm.

A series of nine programs are said to provide inventory control, minimize the risk of scratching a valid tape and also flag tapes eligible for release. It is intended for tape libraries ranging in size from 300 to 10,000 reels.

Other software to help maintain tape libraries is published in the *ICP Quarterly*, a catalog of software which can be ordered from 2506 Willowbrook Parkway, Indianapolis, Indiana 46205.

In Part 4, Computerworld *will look at another method of solving the tape library problem – with mass memories.*

Gould Now Interfaces Its Printer/Plotter To CDC Systems

CLEVELAND – Gould, Inc. has developed a system for operating its 4820, 5000 and 5100 series electrostatic printer/plotters on-line with Control Data Corp. (CDC) 3000, 6000, 7000 and Cyber series computers.

The Gould CDC 3000/6000 interface unit operates from a programmer's console. The standard interface unit accommodates one CDC computer channel and one printer/plotter.

It can be designed, however, to handle up to four printer/plotters concurrently, the firm said.

The unit's programmable controller matches responses to the CDC's data channel. It can, for example, emulate any CDC 3000 peripheral, a spokesman added.

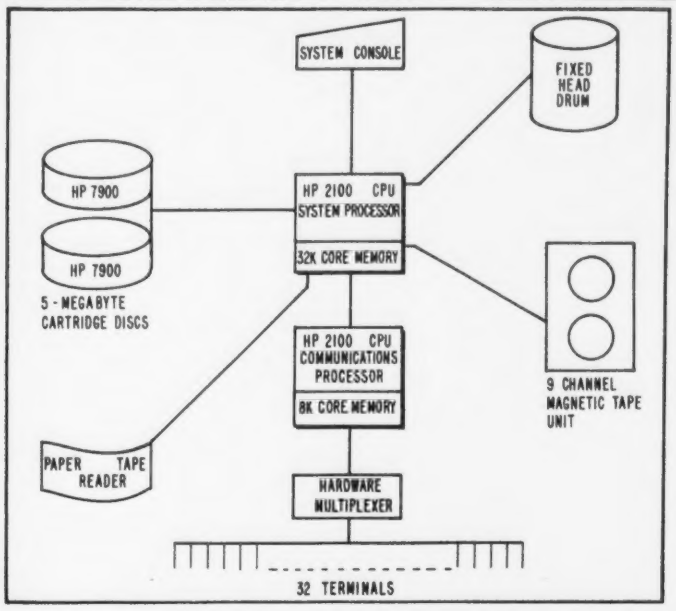
I/O operations of the interface unit follow CDC 3000 data channel protocol. To operate with other CDC series computers, the interface unit must be connected to a CDC 6681 data channel converter, he pointed out.

In the event of a power failure, the interface's power fail mode will shut down. When power is restored, the unit reinitializes all values and readies itself to communicate with the data channel without intervention, the firm said.

A control program is available for the Gould interface to operate the printer/plotter under the CDC Scope system.

An off-line package also is available for outputs on a 7- or 9-track, 800 bit/in. tape.

The interface, priced at $10,900, is available from Gould at 3631 Perkins Ave., 44114.



A typical configuration of the Hewlett-Packard 2100F time-sharing system used at 13 Dutch universities is shown above. Each system can handle 32 users concurrently.

Net Includes 121 Terminals

Four T/S Systems Link 6 Colleges

AMSTERDAM, The Netherlands – When the Dutch government, in 1968, recommended computer education as part of its Hogere Technical School (HTS) curricula, 13 of the 28 colleges decided against using expensive, large-scale computers.

Instead, after thorough investigation, these 13 autonomous schools banded together, planned and consequently installed low-cost mini systems.

These colleges, which educate students to the level of a bachelor's degree, today are served by four time-sharing minis located in the Haarlem, Hengelo, Utrecht and Rijswijk schools. In all, more than 5,100 technical students have access to the computing systems through 121 terminals distributed throughout the schools.

To connect distant colleges into the computing networks, six Racal Milgo T16 multiplexers are used which synchronize 16 lines and transmit data on single leased telephone lines at a speed of 2,400 bit/sec. This reduces long distance communications costs.

Low-speed modems transmitting data at speeds up to 300 bit/in. connect the computers with local lines to the Den Haag college and second colleges in the cities of Amsterdam and Utrecht.

Dr. R. Charles Van Maanen, head of the task force that recommended the mini networks and

Miniworld

present coordinator of the multischool project, said that "the decision to go for the interactive minicomputer system has paid off. Students actually get involved with a computer that can communicate with them.

"The Hewlett-Packard (HP) 2000Fs can respond instantly to the students. This is preferable to batch-mode operations where students have to check an entire printout before noting their mistakes."

The computing systems, each of which can handle as many as 32 users concurrently, are in use 24 hours a day throughout the school term. In some colleges, officials were even forced to assign terminal time because of the enthusiastic student response.

The number of terminals each school is assigned depends on the number of students it teaches. Haarlem, for instance, is one of the largest technical colleges and has 14 terminals for its more than 600 students who use the computer regularly.

Day-to-day exercises and introductory programming courses take up seven terminals. Two terminals each are assigned to the hydrology and aeronautical departments, while ship building and electronics faculties each have one terminal at their disposal.

One special terminal configuration, installed in each of the colleges, is used only for administrative tasks such as setting up classroom, student and teacher schedules. The terminal includes an optical mark reader with which multiple-choice tests marked on specially designed cards may be entered into the computer for grading. The device is also used to edit and correct programs.

"Although the computer itself is the subject of study," Van Maanen said, "greater emphasis is given to its role as a tool in the solving of technical problems. At the moment, about 25% of our teachers implement the computers in their courses using computer simulations and models designed to teach methods of attack for any number of technical problems the students might encounter."

With a main processor with 32K words of memory, an 8K front-end processor, 10M bytes of moving-head disk storage, 2.4M bytes of fixed-head disk and a 9-channel magnetic tape unit, each HP 2000F system has sufficient computing power to allow programs to be added and expanded, he noted.

"Ease of use, flexibility to expand and low cost were determining factors in choosing the minicomputer systems," said Van Maanen.

"The four systems were installed in 1973 at a total cost of about $1.3 million, but additional savings in time and and money are being realized in our network operation that would not have been possible had each college purchased its own computer.

"For example," he explained, "duplication of programs are eliminated. Even though individual schools have differing computational needs, there is an interchange of programs."

One result of regular monthly meetings held by computer experts from each school was the adoption of a time-saving program to grade multiple-choice tests.

Commented one school official, "It is much easier to solve problems with an experienced pool of programmers working in every college. Everyone benefits from their innovations."

The secret to winning on all the tracks.

The most expensive race in the world takes place right in the computer room — every time that half-mile of tape goes on the drive.

The result of lost data because of faulty tape might only be a little inconvenience, but it could just as easily result in an expensive business foul-up.

The secret to winning this race is really no secret at all. It's Epoch 4.

With Epoch 4 you get 100% certification on *all* the tracks, *plus* a coating that's 8,000% tougher than any other tape.

Every race has its losers. Epoch 4 is a born winner.

GRAHAM MAGNETICS
Graham, Texas 76046

Small Virtual Memory Machine Keeps Pace With Firm's Growth

LYNCHBURG, Va. – A significant increase in business has caused a 73-year-old engineering/architectural/planning firm here to switch to a small virtual memory computer.

Before switching to Digital Scientific Corp.'s Meta 4, Wiley & Watson, Inc. had for eight years relied on a single-disk Basic IBM 1130 with an 8K (16-bit word) core and a 100 line/min printer.

According to Jack Thompson, manager of computer systems, there were basically three reasons for the new computer: an increase in the firm's business, an expanded utilization of computer programs and processing and even greater anticipated increases in both business and computer usage in the near future.

"In 1972, Wiley & Wilson used some 155 hours of productive computer time; in 1973, this jumped to 360 hours," Thompson said.

"So far this year, we are 14% ahead of last year. With a 16K memory, the Meta 4 with its virtual array storage system will actually run programs requiring better than four times this capacity.

"For example, a lot of people were surprised that we could handle the Environmental Protection Agency (EPA) Water Quality Model used in the James River study. I feel sure we'll be able to use most other models once we learn how to take full advantage of the hardware."

The EPA Water Quality Model used in the study was Qual II, a program simulating the steady-state and dynamic behavior of selected constituents of streams such as phosphorus, dissolved oxygen, caliform and nitrogenous oxygen demand.

Although the program, as received by Wiley & Wilson, required a minimum core of 96K words, the Meta 4 system with 16K core was able to handle it satisfactorily. Wiley & Wilson placed all real arrays into virtual memory and executed the program.

Some other areas in which the company utilizes its computer include fault current analysis, automated specification, sewer system design and plot and contour plotting direct from field data.

Wiley & Wilson has also found useful computer applications in hydraulics, sewerage, site planning, air conditioning and heating load calculations, structural analysis and design, lighting requirements, electrical design for fault current conditions and energy conservation.

Plotted output from coordinate geometry, sewer design and highway applications provide documents for data unification and final drawings.

Miniworld

'Fly Reader 3' Needs 5-Volt Power Source

BURLINGTON, Mass. – The Fly Reader 30, a 300 char./sec paper tape reader from Teleterminal Corp., requires only a single 5-volt power source at 2 amps, according to the firm.

The bidirectional reader with TTL interface can be used with 8-level 1-in. tape. It will accept without adjustment any tape material with transmissivities up to 60% (oiled yellow paper), the firm said.

The Fly Reader 30 costs $365 from the firm at 12 Cambridge St., 01803.

Controllers Link Nova With Variety of Drives

ELMSFORD, N.Y. – Two controllers that link Data General Corp. Nova minicomputers to a variety of other vendors' disk drives have been introduced by Mini-Computer Systems, Inc.

A $3,500 controller serves all Wangco, Inc. drives and the Diablo Systems, Inc. 30 and 40 series. An $8,500 version allows Novas to control Century Data Systems Model 114 and Control Data Corp. 40M-byte and 80M-byte units.

Mini-Computer Systems is at 525 Executive Blvd., 10523.

DEC Hospital System Monitors 15 Instruments

MAYNARD, Mass. – Digital Equipment Corp. (DEC) has packaged a PDP-11/10 minicomputer for clinical laboratories that can collect, record and process data from clinical instruments while simultaneously performing general calculations for administrative functions, the firm said.

Called the Programmable Data Logger (PDL), the new system is designed to monitor up to 15 instruments simultaneously and is programmable in Basic.

PDL system prices range from $21,000 to $28,000, depending upon the number and type of instruments to be monitored.

Datum Controller Fits Interdata Minis

ANAHEIM, Calif. – Datum, Inc.'s Model 5091 magnetic tape controller is said to allow Interdata minicomputers to operate with up to four parallel magnetic tape transports per controller.

Compatible with Interdata operating and diagnostic software, the controller accepts transports with any combination of seven or nine tracks, 12.5 in./sec to 200 in./sec, odd or even parity, with multiple data densities of NRZI and PE formats. All transactions are in bytes.

The controller costs $5,020 from the firm at 1363 S. College Blvd., 92806.

CAI Floppy System IBM-Compatible

IRVINE, Calif. – An IBM media-compatible floppy disk system has been introduced by Computer Automation, Inc. (CAI). The system offers direct memory address (DMA) operation and includes two or four drives per controller.

The CAI unit uses soft-sectoring on unaltered IBM media, writing sector numbers for identification.

A system including two drives, power supply, cables, controller, documentation and software is priced at $4,300.

Controllers, which occupy only one-half of a slot in the computer chassis, are available separately at a price of $930. CAI is at 18651 Von Karman, 92664.

GA Data Management Additions Aid Satellite Net Configuration

ANAHEIM, Calif. – Two members have been added to General Automation, Inc.'s (GA) DM 100 series of minicomputer-based data management systems.

The systems – designated the DM 130/1 and the DM 135 – offer the user flexibility in configuring satellite elements in a data management network, GA said.

The DM 130/1, a minimum satellite configuration with full processing capability priced from $29,500, is configured for source data entry, limited local processing and telecommunications transfers to larger systems, the firm noted. It can be expanded to a more powerful configuration in the field.

The DM 135 is an expanded version of the DM 130 satellite processor. According to GA, it is specifically designed for those users who need a stand-alone data management system, but not extensive communications capability.

The DM 135 supports from one to 10 CRT workstations and other peripherals, including magnetic tape units. Minimum configurations start at under $40,000, but a more typical system with 48K words of core memory, a 400 card/min reader, a 600 line/min printer, a 25M-byte disk, seven CRTs and a magnetic tape unit is priced at $97,000.

GA is at 1055 S. East St., 92805.

75 Char./Sec Punch Accepts Different Tape Widths

WESTBURY, N.Y. – The 75 char./sec punch from Precision Mechanisms Corp. automatically compensates to accept 1-in., 7/8-in. and 11/16-in.-wide tapes interchangeably, the vendor said.

The P7501, including motor, motor start capacitor and rubber isolating pads for three-screw mounting, costs $590 from the firm at 44 Brooklyn Ave., 11590.

Miniworld

Kennedy Tape Controllers Link Transports to Interdata Units

ALTADENA, Calif. – Two magnetic tape controllers from Kennedy Co. are said to supply complete interfacing and formatting between Kennedy 9000, 9800 and 9700 tape transports and Interdata 7/16 and 7/32 computers.

The units provide multitransport, IBM-compatible operation of up to four transports in any combination of 7- or 9-track tapes with speeds from 12.5 in./sec to 125 in./sec.

The controllers are completely hardware- and software-compatible with the Interdata computers, including odd or even parity configuration with multiple data densities of NRZI and PE formats, Kennedy said.

The tape controller mounts in a 19-in. rack and contains its own chassis and power supply. A one-half slot is required in the CPU or expansion chassis. Provisions have been made to use the entire peripheral address range, and all basic tape drive functions are under program control, the company said.

Prices range from $4,489 to $7,245, depending on computer model, tape format and cabling required. Kennedy is at 540 W. Woodbury Road, 91001.

Qume, Diablo Printers Get Bedford Interface

BEDFORD, Mass. – Bedford Computer Systems has introduced a printed circuit board to interface the Qume Q-30 printer and the Diablo Hytype I printer with Interdata minicomputers.

The interface design supports all of the features inherent in the printer mechanism, Bedford said. These include 30 char./sec printing, plotting with a resolution of 1/60-in., proportional spacing and two-color operation.

Designed on a single 15-in. square printed circuit board, the interface plugs directly into the multiplexer channel of the Interdata minicomputer. A 50-wire flat ribbon cable is included for the printer interconnection.

The interface costs $1,500 from the firm at Three Preston Court, 01730.

Rolm Disk System Stores 2.49M Words

CUPERTINO, Calif. – Rolm Corp.'s Model 3341 is a moving-head, dual-cartridge disk system that offers up to 2.49M 16-bit words of storage for the firm's Series 1600 line of minicomputers.

The real-time disk operating system provided with the 3341 allows multitasking in both background and foreground, program overlay and spooled I/O.

The moving-head disk system consists of a dual disk drive (IBM 2315-type) with one fixed and one removable cartridge and a controller. The average head positioning time is 35msec, with a 10 msec minimum and 60 msec maximum.

The Model 3341 costs $14,000 from the firm at 18922 Forge Drive, 95014.

Robins Rewinder/Feeder Controls Punched Tape Flow

COMMACK, N.Y. – The Series 200 punched paper or mylar tape rewinder/feeders can control the flow of punched tape either for short-term transmission or repeat or for longer term storage, according to the vendor, Data Products Division of Robins Industries Corp.

The devices can accommodate reels with a 1/2-in. hub. Speeds range from 15 code/sec to 350 code/sec on a 2-in. core and from 33 code/sec on a 4-1/2-in. core.

A torque-responsive arm controls the winder's on/off operation. When there is no demand for tape, the motor shuts off automatically, permitting unattended operations.

The Series 200 devices cost between $300 and $350, depending on speed. Robins Industries is at 75 Austin Blvd., 11725.

Why are other computer companies refusing to run benchmarks against the Eclipse?

Apparently, they've seen some of the results.

Eclipse has been running Fortran benchmarks faster than an IBM 370/155.

And more than twice as fast as the PDP-11/45.

It's even beaten out a Xerox Sigma 9.

And those benchmarks were not ones we designed to make Eclipse look good. We only ran programs that prospects asked us to run.

Not only that, the Eclipse they were run on was using core memory. If we had used semiconductor memory with cache, you can imagine what would have happened.

Eclipse may have caught the competition off guard, but that's just what we expected it to do.

That's why we built Eclipse around a new microprogrammed architecture and an instruction set designed for high level languages and real time operating systems.

And that's why we gave it the fastest Floating Point Processor in the industry.

But making a computer fast is one thing. Getting all that speed out of it is another.

So we also came up with a sophisticated new set of Eclipse software: A Fortran 5 package, and a new Mapped Real Time Disc Operating System with features like virtual overlays and window mapping. (Which you may not have heard about because we just invented them.)

Which means if you don't want to end up with a computer that's been eclipsed, you're going to have to do something about it.

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CORRECTION! CORRECTION!

In our January 29 issue we incorrectly printed the wrong dates for Cullinane seminars to be held at the Computer Caravan. Please note the correct days for the following seminars:

Day 2 2 p.m.

3 hours, all cities

IDMS

Management Overview – A system overview for management personnel including competitive features, costs, users and Cullinane Corporation background. Followed by:

Technical Presentation – In-depth presentation for technical personnel including IDMS, generalized communications interface, IDMS/CULPRIT, Data Dictionary, DBA utilities and comparison with other systems.

Day 3 9 a.m.

2 hours, all cities

EDP-AUDITOR/CULPRIT

Discussion of the use of EDP-AUDITOR/CULPRIT with IMS/TOTAL/IDMS, its special versions for banking (CIF/RMDSO), Insurance (CFO/ALIS), and Manufacturing (BOMP/MRP) and a comparison with other audit and retrieval systems.

Customized Design of Elevators Aided By Automated Drafting, Design System

By Patrick Ward
Of the CW Staff

TOLEDO, Ohio – Manufacturing elevators which will be used in large buildings is not an assembly line process, since requirements, styles, objectives and local building codes are likely to differ in each building.

Computer-assisted design and drafting can be valuable for this industry, since it helps the manufacturer customize his products and run an efficient manufacturing operation.

Reliance Electric Co./Haughton Elevators has turned to this type of system to standardize design, documentation, drafting and manufacture of a wide range of possible components and assemblies.

Haughton chose a system from Computervision Corp. that includes a Data General Nova 2 minicomputer, 276K of disk storage, two large interactive automated drafting tables and an interactive CRT station.

Automation Brought Improvemei

The elevator manufacturer uses the automated drafting system for:

- Designing electrical lines, in which the system produces schematic diagrams for electrical power lines and control circuitry.
- Producing manufacturing drawings for elevator fixtures – for example, buttons, switches, signals, indicator panels and controls.
- Producing elevator layouts, including plan views of the elevator machinery and plan and elevation views of hoistways throughout the building.

The automated drafting system has brought an improvement in "quality, legibility, accuracy and speed" over previous drafting work, noted Robert Lauer, vice-president of engineering.

It means that a Haughton engineer can enter a particular component into the system's memory whenever he feels it could be used on a subsequent design. The next time it might be useful, the draftsman can just call up the assembly to be printed out at the specified place and scale.

This approach is especially useful for "partials," or drawings of items which are likely to appear on every job, Lauer noted.

The automated system can thus produce a previously used design that incorporates standard Haughton components and assemblies as much as possible. These are the assemblies that are most available and easiest to manufacture, as well as being the ones with which manufacturing people have the most experience.

'Only Invent Something Once'

"We only invent something once," Lauer said. "Our manufacturing people have come to expect standard, legible, error-free manufacturing and installation documentation.

"Eliminating documentation errors eliminates manufacturing errors and saves money. The longer we use this system, the more valuable it becomes, because the library of standard components becomes more comprehensive and more standardized all the time."

Besides the drafting system, Haughton uses General Electric and Computer Sciences Corp. time-sharing services for calculations and verifications on the basic elevator structure and cabling.

Lauer said draftsmen learn to work with the automated drafting system quickly. Occasional shutdowns which have been the only problem with the system have not been excessive, he added.

Speaker Claims DP Needs Financial Justifications

MONTREAL – It is time to get rid of the "mechanization mentality" in data processing, a senior corporate systems director said recently.

"Data processing in the 1970s requires the maximum utilization of technology with the best people, but must produce a financial justification," according to George F. Sekely, director of information systems, Canadian Pacific Ltd. (CP).

Speaking on information systems in the late '70s, he stressed that each DP project should have a definite financial justification.

"This is often difficult to find," he cautioned. "We can tell how much the operation will cost, but not how much it will save."

CP, he pointed out, has established an information systems advisory committee of seven vice-presidents "to review strategies and ensure that major projects have well-identified, measurable objectives, without which no investment should be allowed to proceed in the first place."

Listen to Users

Singling out proper communication with the real users as essential during development and throughout the life of a system, Sekely noted: "Failure to heed advice from those for whom the systems are built may lead to systems that may not be accepted at all."

Most early systems attacked areas where DP machines were already being used and where mechanization of manual procedures would obviously be beneficial. "But we must now face the fact that our early systems are crumbling and ready for rework," he warned.

CP's information planning group has assessed the potential of DP usage areas, data identities, data volumes and computer operations. This enables the company to see how to make best use of existing facilities and to plan future investments, he explained.

CP is building a current systems data base to enable it to shed most of its traditional paper-producing systems in a transition "from integrated batch systems to a modular data base environment."

"Our new systems are defined in a modular way which allows us to implement, change and replace them if necessary in a modular fashion instead of having to wade through large, complicated programs for every minor alteration."

Computerized Md. Van Scores Illegal Drivers

ELKTON, Md. – A project aimed at identifying illegal drivers is being conducted on Maryland state highways with the aid of a computer-equipped van.

The van, which also has a computer storage device and a police radio, is accompanied by a state police car.

The van is driven along the highway at reduced speeds, with an observer keying license plate numbers of passing vehicles into the computer. If a number matches a programmed category, such as suspended driver or stolen car, the computer signals a "hit" and displays the information on a video display device.

The accompanying state trooper is then radioed.

House Bill Puts Limits on Access to Criminal Records

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – A bill that would control access to and dissemination of both manual and automated criminal record information, as well as provide for sealing inactive records, has been introduced in the House of Representatives.

Originally drafted and introduced in the 93rd Congress by now-retired Sen. Sam Ervin (D-N.C.), the bill is an attempt to strike a balance between the needs of law enforcement agencies for personal information and the rights of individuals who come in contact with the system.

Introduced by Rep. Don Edwards (D-Calif.), chairman of the House Judiciary Committee's Subcommittee on Civil and Constitutional Rights, the bill provides detailed standards for handling criminal justice information to assure it is not misused.

The Federal Government has already spent more than $300 million automating criminal justice files, Edwards said.

While law enforcement practitioners believe more and better information can help fight the burgeoning crime rate, "unfettered access to all information on an individual can lead to considerable abuses," Edwards said.

"Arrest records, which carry notations of a person's arrest but frequently carry no disposition have been used to deny people employment, housing, credit and other necessities," he said.

The bill would protect criminal information in systems maintained by the Federal Government, in state or local governments using federal funds and in interstate systems.

It does not cover police blotters, court records of public criminal proceedings or official records of pardons, court opinions, traffic offenses, records relating to violations of the Uniform Code of Military Justice or statistical or analytical reports in which the identity of individuals is not discernible.

Under the bill, exchange of arrest record information or nonconviction record information is restricted to screening of employment applications for law enforcement jobs, commencement of prosecution or determining whether a person should be held or released in connection with criminal proceedings.

When an individual has not yet been arrested, the record may be used only to develop investigative leads, not as a basis for future arrest or to alert a law officer that a particular individual may present a danger.

Arrest information may be used only for the purpose for which it is sought and may not be retained or copied by the requesting agency beyond the time necessary to accomplish the statutory purpose for which it is requested.

When such information is requested, the requesting agency must notify the individual in question and inform him of his right to review or challenge the accuracy of the data it receives.

Positive Identification Necessary

Criminal histories in manual or automated files will be provided only if the inquiry is based upon name or other positive identification such as fingerprints and will not be accessed on the basis of other data elements such as type of offense.

Access of this type will be permitted only for the purpose of developing investigative leads for a particular criminal offense provided the law enforcement agency seeking such information obtains a class access warrant from a U.S. magistrate or a judge of competent jurisdiction.

As for security, accuracy and timeliness, the bill provides that each criminal justice information system shall adopt procedures to prevent unauthorized disclosure of information contained in the system and to insure that it is kept up-to-date.

The procedures will also insure that agencies to which records are disseminated are informed of correction, deletion or revision of the records.

Finally, requests for information will include the identity and authority of the requester, the nature of the information provided, the nature, purpose and disposition of the request and pertinent dates.

Purging and Sealing

The bill provides that a record of an individual convicted of a felony should be sealed seven years after the last entry of information and, for nonfelony records, sealing is recommended after five years.

Records indicating arrest but not conviction shall be sealed two years following arrest.

Finally, in cases in which a law enforcement agency has elected not to refer a case to a prosecutor or in which the prosecutor has elected not to seek an indictment, the record should be sealed "promptly."

Any individual with an arrest record will be entitled to review the record and obtain a copy for the purpose of challenge, correction or the addition of explanatory material.

Criminal justice intelligence and investigative information would be given especially strict protection by the bill. Such information would not be permitted in a criminal justice information system and, within the agency that collected it, only those officers or employees who have both a need and a right to know would have access to it.

Direct remote terminal access to such information would not be permitted outside the agency which collected and automated the intelligence or investigative information except when authorized by federal or state statute. An assessment of such information may be provided to a government official only when necessary to avoid imminent danger to life or property.

Any government agency or employee who disseminates this type of information to influence a political campaign, discredit a candidate for office or otherwise intimidate an individual in the exercise of first amendment rights would be liable to a $5,000 fine, imprisonment for not more than five years, or both.

The bill would create a Criminal Justice Information Systems Board to enforce the law. It would also permit the proposed board to operate a manual or automated interstate criminal justice information system containing data sufficient to identify the individuals and the criminal justice agencies possessing additional criminal information concerning such individuals, much like the pointer system originally suggested by Project Search.

Any state law or regulation which provides greater privacy or protection for criminal information would take precedence over this act or regulations issued pursuant to it.

Both civil and criminal penalties have been provided, and the law would go into effect two years after enactment.

In Network of Appalachian Hospitals

System Safeguards Prescription Drug Distribution

By John Hebert
Of the CW Staff

LEXINGTON, Ky. – An advanced system of distributing prescription drugs to patients has begun operations at a network of 10 hospitals strung out over a 250-mile area in Appalachia.

At Appalachian Regional Hospitals' (ARH) headquarters here, a Univac 9480 computer system is used to handle patient drug requirements while employing stringent safeguards to prevent the possibilities of over- or underutilization of drugs, dangerous interaction of drugs or the prescribing of drugs not compatible with patient allergies or disease conditions.

The ARH drug prescription system includes 196K bytes of main memory, three Uniservo 6C tape units and six Univac 8424 disk units.

Stored in the computer system are the medication histories of approximately 40,000 persons living in rural communities throughout Appalachia.

A data communications system links the computer to 10 Uniscope 100 visual display terminals in the Central Prescription Services (CPS) pharmacy 175 miles away in the ARH facilities at Williamson. The system is designed so that it may someday link all outpatient and inpatient pharmacies at ARH facilities to the computer.

To protect the confidentiality of this data, a special locking device was designed for the terminals to prevent unauthorized persons from securing access to the information. In addition, a special code must be keyed into the device before any data can be obtained from the system.

Patient Medication Profiles

With this system, pharmacists utilizing computer-stored patient medication profiles (PMP) are now able to keep much closer observation of a person's drug history. The usual procedure is to key in the patient's Social Security number on the terminal to secure access to his PMP. However, the information can also be obtained by entering the patient's name.

Every PMP contains the patient's full name and address, Social Security number and other pertinent identification numbers, a financing mechanism for prescription payment and notations identifying any allergies to drugs.

The medical information presents a chronological prescription record with the name of the drug, prescription number, the prescribing physician's name, dosage, diagnosis, date of refill, number of refills allowed and the pharmacist's initials.

Each day prescriptions are routed to operators manning the display terminals. The operators access the required patient records from the data bank and add the new prescription data. Refill prescriptions represent approximately 50% of the workload.

The system automatically assigns a number to the prescription and arranges billing to third-party insurance.

Concurrently, a printer at the CPS pharmacy in Williamson prints out a unique prescription label to go on the drug container. This prescription label contains, in addition to the physician's directions, information on the proper storage and stability of the drug as well as information concerning any possible side effects.

These forms, together with the original prescription, are then passed on to one of five staff pharmacists. Using their own display terminals, these pharmacists cross-reference the patient's drug profile and determine whether there are any inconsistencies in the new prescription based on previous history. If so, the pharmacist will contact the prescribing physician to discuss his concern.

If not, he will key in his initials on the terminal and dispense the prescription. The CPS pharmacy processes a daily average of 1,000 prescriptions.

One of the key elements of the PMP system is the capability to alert the pharmacist to possible harmful drug interactions.

In such cases, the display will show a conflict screen containing the drug name causing the interaction. The pharmacist may then wish to alert the physician so that appropriate changes can be made in the therapy.

Another benefit of the system is the provision for maintaining records of drugs by manufacturers' lot numbers so that, in the event of a recall of a particular drug, patients using that medication can be readily identified.

"Our DP capability provides us with a technology generally not available in the delivery of pharmaceutical services at this time. This technology makes feasible the application of sound professional judgment to each patient by freeing our pharmacists from routine clerical duties.

"Secondly, the data storage and retrieval capability meets any present or foreseeable need related to the drug use component of a Professional Service Review Organization now required by federal law," R. Paul Baumgartner Jr., ARH director of pharmaceutical services said.

Besides PMPs, the system handles a wide variety of other tasks including purchasing of supplies for all the ARH facilities and the compilation of medical statistics including bed utilization, admittance and discharge records and census reporting.

Other DP chores involve a personnel records system, general accounting and the payroll for some 2,700 persons within the ARH organization.

University Offers Unusual Gift Idea

SPRINGFIELD, Ore. – The University of Oregon offered an unusual option for Christmas presents – gift certificates for computer lessons.

The certificates entitled children from grades six through 12 to an introductory lesson and one to five hours of computer time. They were available at $3.50 an hour and could be redeemed between Dec. 30 and Jan. 15.

Joanne Hugi, director of user services for the computing center, termed the idea "a success." Of the 15 children who participated, about 50% had no previous computer experience.

Hugi said the program was a good opportunity for staff members to interact with the community and hopes to offer the certificates again during slack periods.

DP DIALOG

Notes and observations from IBM which may prove of interest to data processing professionals.

At a 3650 point-of-sale terminal, a sales clerk "wands" a magnetically-encoded merchandise ticket at a Dillard's Department Store.

IBM Industry Systems Meet the Public

Supermarket checkout clerks, bank tellers, department store salespeople—all face a steady stream of customers who seem to have one thing in common. They're in a hurry. They'd like to be taken care of so they can get on to something else.

Now three new IBM systems are at work aiding people who serve the public. The systems are making possible faster, more accurate customer service and they're providing management with swifter, more comprehensive information. Much of this information is gathered when transactions actually take place, at the point of sale or at the teller's window. The result should be a marked increase in overall operating efficiencies.

The three new systems are the IBM 3600 Finance Communication System, the 3650 Retail Store System and the 3660 Supermarket System. In recent months, each of the systems has been installed at a number of locations. Experience with them, although brief to date, already throws light on the kind of benefits these systems help make possible.

Dillard Department Stores, with headquarters in Little Rock, Arkansas, operates 30 full-line department stores in six states. New stores are being added at an average of three a year and sales have grown rapidly to a projected $185 million in 1974.

Dillard's is using the 3650 Retail Store System in two stores, one in Little Rock and the other in Lubbock, Texas. Three more stores will be converted to the 3650 this year. Components of the system now operational at Dillard's include point-of-sale terminals, ticketing units and store controllers, the latter interfacing with the terminals on one hand and with Dillard's IBM System/370 Model 145 on the other.

"Results with the 3650 so far have been very good," says Archie Crittenden, vice president of corporate systems and data processing. "We expect the system will provide us with both flexibility and centralized control."

Chemical Bank, New York, was one of the first commercial banks to install the 3600 Finance Communication System. With 158 offices in metropolitan New York, plus comprehensive domestic and international banking services, Chemical's ultimate objective with the system is the establishment of a single data processing network for the entire bank.

"We now have numerous networks with various types of terminals linked to our IBM System/370 computers," points out Donald R. Moore, vice president. "The 3600 is a major step toward integrating all these terminals into one compatible system. And with its extensive on-line capabilities the 3600 will put us on the road to real-time control of operations."

And James F. Welch, vice president, information systems, points out that the 3600 should make possible substantial savings in time and costs. "For instance, the system will be able to produce up-to-the-minute account balances and place holds for all checks cashed," he says. "This could eliminate time-consuming check-cashing approvals."

Ralphs of Los Angeles is a major supermarket chain on the West Coast, with 80 stores in California. The company sees the 3660 Supermarket System as making possible a major advance in customer service. In October a Ralphs store in Lakewood, California was completely converted to 3660 operation, with the company's IBM System/370 Model 145 serving as the host computer.

"The transition was smooth and our Lakewood customers are responding favorably to the system," reports John Robertson, vice president of information systems. "Before converting, we set up a demonstration booth in the store to familiarize our customers with the procedures involved. They particularly like the register receipt tape, with each item identified and priced.

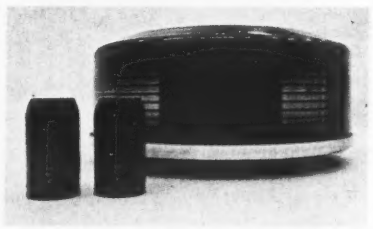
"Accuracy will be another benefit," he continues. "When the price of an item is retrieved from the 3660, the shopper doesn't miss any sale or promotional price and is always charged the correct amount of sales tax on the correct taxable item." **IBM**

New IBM System Reduces Cost of Storing Data

The increase, both in multiprogramming and complex applications, has pointed up the need for more on-line data storage capability. As scheduling becomes more difficult, the handling and storage of tape reels and disk packs takes up more space and ties up many skilled people.

Now there's a new way to store and access information. It's called the IBM 3850 Mass Storage System and it extends the virtual storage concept to direct-access storage devices. Combining the economy of tape processing with the flexibility of disk, the 3850 can expand a user's on-line data storage capacity to as much as 472-billion characters of information.

Use of the system can end practically all manual handling of tape reels and disk packs. At the same time, the 3850 can dramatically reduce the actual monthly cost for storing a megabyte of data down into the 20-to-50-cent range. This can make new complex



applications economically feasible.

Key to the new system is the IBM data cartridge, only two inches across and four inches long, which can hold up to 50 million bytes. Two cartridges have a storage capacity equal to that of one IBM 3336 Model 1 Disk Pack (shown above).

Cartridges like these are stored in a "honeycomb" of cells. When data is needed for processing, a cartridge is removed from its cell by an automatic mechanism and the data is read onto an IBM 3330 Disk Storage for computer use. **IBM**

A Test for the Solar Home

A computer in the garage and solar panels on the roof were two features of this home in Columbus, Ohio. The home was built by the Homewood Corporation of Columbus in an effort to make a real contribution to solving the nation's energy problems through low-cost residential energy.

Ohio State University, using the home as a field test laboratory, installed an IBM System/7 to demonstrate the technical and economic practicality of solar heating and cooling in single-family homes.

The computer took readings every 15 minutes. As it monitored the home, it checked temperatures in various spots around the house, recording the opening and closing of doors and checked such energy-related factors as thermostat setting, air and water flow and use of appliances and lighting. Outside, the computer kept track of the temperature, precipitation, wind direction and velocity.

Engineers at Ohio State are evaluating this information. Results of their analysis will give developers like Homewood the data needed to build the most efficient solar home.

Says Homewood vice president William Goldman, "We want people to see that solar energy for the home is not a dream. It's a real possibility." **IBM**

An experimental solar home heated and cooled by the sun.

Advertisement

Helping Computers Operate At Top Efficiency

Two years ago, Bernie Patton, computer operations manager for Deere & Company of Moline, Illinois, faced a difficult challenge. Deere's progressive data processing plan required a major equipment and programming conversion in a comparatively short time (from a System/360 Model 65 multiprocessor system and two System/370 Model 155s under OS/MVT HASP to dual System/370 Model 168s running OS/VS2 and ASP).

Introducing change into a production system can increase the possibility of error, and Deere's plans called for numerous major changes. At the same time, the testing of system programming changes demanded an hour and a half of dedicated machine time every weekday. This required taking 47 RJE terminals linked to Deere plants, sales offices and parts depots off-line.

"Production pressures resulted in insufficiently tested software," says Patton, "and that caused us too many outages. The productivity of our data processing professionals was being hampered by a lack of test time. It was costing us time and money, and our users were unhappy."

Patton and his staff mapped out a step-by-step conversion plan. They were determined to maintain maximum availability on the new Model 168s and it was essential that all new programming work smoothly. As a result, a System/370 Model 145 with virtual storage capability was used to meet the testing requirements.

Dick Townsend, Deere's manager of computer centers, says: "The Model 145 meant far greater reliability of our programming. We also were able to make changes faster, while encountering fewer problems. Programmer turnaround time was substantially reduced. We were not only able to maintain extremely heavy production schedules but were also able to meet commitments to our user departments." Patton adds: "There is no doubt that the System/370 Model 145 has made a contribution toward increasing the overall productivity of our data processing department."

Soon, Deere will be opening a second computer center, five miles away, with a Model 158 and a Model 168. During lulls in testing, the Model 145 will run as a production machine. At other times, however, it will run under VM/370 for testing. Says Patton: "Every job we can run on the Model 145 under VM/370 will mean one less problem when we put the Model 158 and Model 168 systems on the air."

IBM

Bernie Patton and Dick Townsend (right) review results of a programming test on the Model 145 with Karen Ziegler, systems programmer.

Researching Energy Alternatives

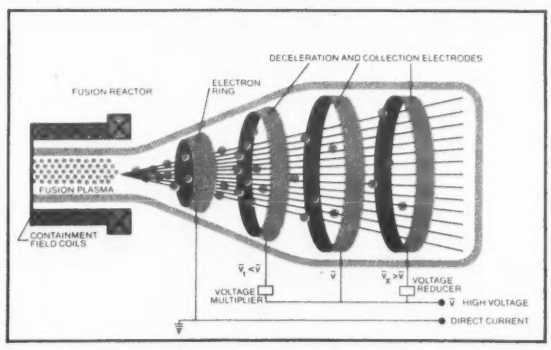
Energy development has become a critical national priority, involving both government and private business. To help meet this challenge IBM has recently increased its energy research efforts as exemplified by the work at its Scientific Center in Palo Alto, California, headed by Dr. Horace Flatt.

"Here we have combined some of the best talents within IBM to work on one problem—to help find solutions to the nation's energy problems through the use of the computer," says Dr. Flatt. "Our scientists are now involved in a variety of projects, including studies of pollution and optimizing electrical power distribution, as well as thermonuclear fusion."

Dr. Baxter Armstrong, manager of the fusion project, describes nuclear fusion as "the far-out technological hope of the energy crisis over the long term. Here at IBM we have worked since 1969 to assess the contribution which the computer can make toward the goal of controlled nuclear fusion."

Fusion reactors, he explains, offer several advantages over today's nuclear fission reactors, including an almost limitless supply of fuel.

"In the Fifties the outlook for achieving this goal of a practical fusion reactor was disappointing. But with the advent of new plasma confinement machines and large, high-speed computers, there is new promise for a solution to this most critical problem. Toward that end we are working here to formulate large-scale computational methods which will permit the realistic simulation of laboratory experiments or eventually, even of proposed fusion confinement machines." **IBM**



Working with a fusion reactor model like this, engineers hope to produce electricity by direct conversion, complementing primary power indirectly generated through a conventional steam cycle. (Schematic courtesy of Dr. R. F. Post of Lawrence Livermore Laboratory.)

Ed Malzahn (right) and Dick Eaton in the Ditch Witch plant in Perry, Oklahoma, created an information system used as an integral part of the business plan.

The Changing Role of the DP Manager

Time was when the data processing manager ran a computer department which sometimes amounted to an extension of the accounting department. Payroll checks, financial statements and general ledger work were the order of the day.

But times have changed. Businessmen no longer look at the computer as a super-adding machine, spewing out just basic financial data. They look to it as an information tool for the entire company, providing tighter control over their assets.

This situation has thrust the data processing manager into a position with much broader and heavier responsibilities. Besides managing a team of programmers and technicians, he must now be able to work with and coordinate information with executives at all levels. He answers the needs of various departments with workable, usable information. In short, he has become an executive making decisions which can affect the entire company.

Responding to these changes, IBM is offering a five-day Data Processing Executive seminar at its Data Processing Division Education Centers in San Jose, California and Poughkeepsie, New York.

Ted Garvey, an instructor in the program, explains: "We stress the need for management involvement in the creation of an information system plan, which is also an integral part of the business plan."

To do this, the seminar focuses on having each student evaluate an organization from the viewpoint of the chief executive. In this way, the DP director can develop an understanding of the problems of the entire organization on every level.

Ted Garvey drives home a point at the San Jose Education Center.

One DP manager who attended the IBM seminar was Dick Eaton, data processing manager of the Charles Machine Works of Perry, Oklahoma, a manufacturer of a broad line of service line trenchers. The trenchers, marketed under the tradename Ditch Witch, are the invention of Ed Malzahn and his father Charles.

As Eaton recalls: "I was brought in to organize the company's data processing department in 1971." "Our idea," adds Ed Malzahn, president, "was to computerize our business because we couldn't keep pace with the way we were growing."

The Charles Machine Works, which has its origins back in 1893 when Ed Malzahn's grandfather opened his blacksmith shop for the homesteaders, now has an IBM System/370 Model 135 operating under DOS/VS using CICS and DBOMP. In the plant, which covers some nine acres, and in the offices, 20 terminals are on line to the computer.

"At first," Eaton says, "I tried to develop an information system for the entire company, from our plant operations right down to the accounting department. The trouble was I didn't zero in on the needs of the other departments and because of this, I ran into some problems.

"The idea of working with the user was something I became more aware of while at the seminar in San Jose," says Eaton, "and after I returned to Ditch Witch, the first thing I did was to get together with Ed Malzahn. We then organized a steering committee which consisted of a task force for each division, from manufacturing to sales. In this way the problems of each department were discussed openly and freely and then, after working with our group of systems programmers, we were able to help work out their problems.

"Just recently, we met with the engineering task force to discuss a comprehensive project control system. This system will enable them to keep track of the costs of 21 different steps during development of a project. They want to be able to find out, via terminals, the exact status of each project as it is developed. From our discussions, the DP department will be able to write programs to fit their requirements. We follow the same procedure throughout the company.

"In the end I guess you could say spending more time with each department and having everyone involved in developing the system has made possible a more well-managed company, as well as a better organized DP department.

"We've really taken a new look at ourselves. We now have a long-range, seven-year business plan, which ties together our business objectives with our data processing requirements. We're into the third year of that plan now and we're right on target."

DP Dialog appears regularly in these pages. As its name suggests, we hope DP Dialog will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP Dialog, IBM Data Processing Division, White Plains, N.Y. 10604.

75-1

IBM®
Data Processing Division

HOWARD COUNTY, MARYLAND
NOTICE OF SALE OF SURPLUS PROPERTY
REVISION I (1/30/75)
BID 75-055

In accordance with the provisions of Section 4.113 of the Howard County Code, entitled "Contracts and Purchasing" Subtitled "Purchasing," the following, having been determined to be Surplus Equipment by the using agency, Howard County, Maryland will accept sealed proposals for the purchase of the following equipment at the Office of the County Administrator, Court House, Ellicott City, Maryland until 2:00 P.M., Friday, February 28, 1975, at which time and place they will be opened and read.

Univac 1004 Computer System

Type/Group	Serial No.	Description
2012-73	899	1004-1-05 Card Proc.
FO675-00	899-1	Aux. Core Storage
2009-00	791	Card Punch

Additional Equipment

Nine (9) Wiring Panels with wires.

Equipment may be inspected at Data Processing Center, Wing A, County Office Bldg., Ellicott City, Maryland 21043, weekdays, 8'30 A.M. to 4:30 P.M. Contact Walter Gischel, phone 465-5000 ext. 248.

Bidders shall submit one price only for all equipment, in its present location. Removal from the location will be the sole responsibility of the purchaser. Any damage to County property as a result of the removal will also be the sole responsibility of the purchaser.

Special Note: Maintenance policy on the equipment will be in effect until January 31, 1975.

The sale will be final. Purchaser must remove the equipment within one (1) day after date of purchase. Payment in cash or certified check only at time of pickup.

Howard County reserves the right to reject any or all bids.

For Information Sharing

IUA to Organize User Group Heads

SANTA CLARA, Calif. – Plans are under way by the Iomec Users' Association (IUA) to form an organization comprised of executives of user groups within the DP industry.

The objective of such a group would be to exchange information on the activities and plans of each user group to better serve the user population, according to Glenn Lutat, executive director of IUA.

"It's entirely possible for an equipment user to be a member of several user groups at the same time," Lutat said.

"He probably wouldn't have time to participate in all the activities of all the user groups, so he wants to be aware of the various services which are available to him in order to make an intelligent selection of those which will help him solve his day-to-day problems."

Lutat said he hopes the group will meet once a year, in conjunction with a trade show, to exchange views.

"At this point," he stressed, "the idea is still exploratory, and we are wide open for ideas and suggestions."

Lutat can be contacted at IUA, P.O. Box 497, 3300 Scott Blvd., 95052.

Societies/ User Groups

MIT's Forrester To Keynote NCC

MONTVALE, N.J. – Jay W. Forrester, Germeshausen Professor at MIT, will deliver the keynote address at the 1975 National Computer Conference (NCC) in May.

Forrester will discuss computer modeling of social systems, with emphasis on the social and economic forces underlying current inflationary trends.

NCC will be held May 19-22 in Anaheim, Calif.

Calendar

Feb. 20-21, Washington, D.C. – **Fifth Annual SigCSE Technical Symposium**. Contact: Prof. Gerald L. Engel, Department of Computing and Statistics, VIMS, Gloucester Pt., Va. 23062.

Feb. 25-27, San Francisco – **Compcon 75/Spring**, the 10th IEEE Computer Society International Conference. Contact: Lowell D. Amdahl, Compdata, Inc., 6150 Canoga Ave., Woodland Hills, Calif. 91364.

March 17-19, Washington, D.C. – **American National Metric Council (ANMC) First Annual Conference**. Contact: ANMC Conference Registration, Suite 700, 1629 K St. N.W., 20006.

March 13, Commerce, Texas – **Computer Users Conference**, sponsored by East Texas State University and Selected Industrial Users. Contact: Donna Hutcheson, Computer Science Department, East Texas State University, 75428.

March 11-12, San Francisco – **Workshop on Basic Hospital Telecommunications**. Contact: Mrs. Marcella Hollinger, Division of Plant Operations, American Hospital Association, 840 Lake Shore Drive, Chicago 60611.

March 12-14, Tampa, Fla. – **Eighth Annual Simulation Symposium**. Contact: P.O. Box 22573, 33622.

March 9-12, New Orleans – **Sixth National Trust Operations and Automation Workshop**, sponsored by the American Bankers Association (ABA). Contact: William R. Moroney, ABA, Communications Group, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

Call for Papers

13th ANNUAL CONFERENCE ON COMPUTER PERSONNEL RESEARCH, Toronto, June 19-20.

The Association for Computing Machinery's (ACM) Special Interest Group on Computer Personnel Research is soliciting papers on research findings, case studies and operating practices concerning computer personnel problems.

Concentration will be in the categories of programmer productivity and programmer certification. Audience involvement formats, such as workshops, are welcomed.

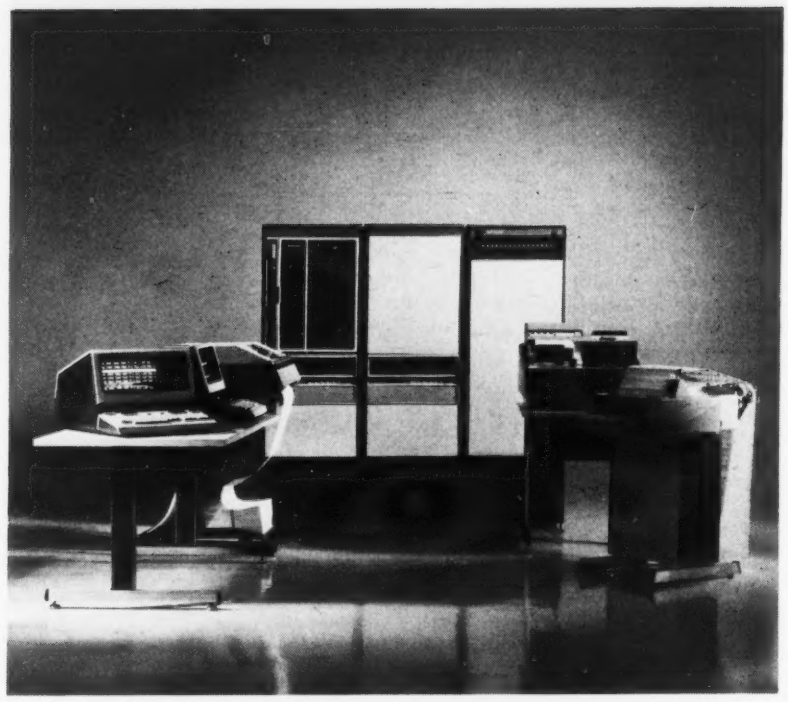
Papers should be a minimum of 500 words in length and must be submitted by March 1 to Daniel P. Freedman, Human Sciences and Technology Group, School of Advanced Technology, State University of New York, Binghamton, N.Y. 13901.

FOURTH DATA COMMUNICATIONS SYMPOSIUM, Oct. 7-9, Quebec City.

The conference theme, "Network Structures in an Evolving Operational Environment," will focus on the problems of designing and operating data networks during a period of rapidly changing requirements and opportunities. Papers in all areas of data networks are solicited.

Topics to be covered will include but not necessarily be limited to design and analysis, software considerations, interfaces, standards, reliability, security, legal and regulatory aspects and measurement and performance analysis.

Prospective authors must submit four copies of completed papers and 500-word summaries by March 15 to Prof. Wesley W. Chu, 3732 Boelter Hall, University of California at Los Angeles, Los Angeles, Calif. 90024.



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Think of them as branch offices. Computers for the many data handling "customers" within a company. The 3000CX is a series of small, terminal-oriented systems that work as an adjunct to the corporate EDP center.

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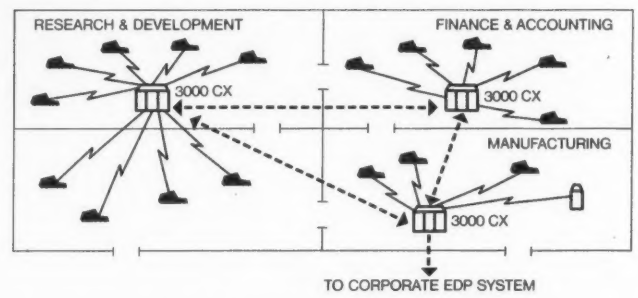
You can run programs in five languages (any combination), in all three modes — time-share, real-time, and batch.

Full service "branches." A Mini DataCenter will support an entire department or division with interactive terminals and options to handle tasks in business, science, and industry.



So, while the folks in R&D are using a Mini DataCenter for real-time data acquisition, shipping is using it to call up orders, and marketing is generating a quarterly sales report. As the volume increases, add another 3000CX (or two).

More for your money. Call HP and see one in action. Then you decide. Four 3000CX models cost from $99,500 to $203,500 in the USA. Low enough to let you branch out now.

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Eight Competitors Called 'Preposterous'

IBM-Justice Case Set to Focus on Market Definition

The appeals court decision on the Telex-IBM case based a large part of its findings on the absence of a relevant market. It found the IBM plug-compatible arena did not in and of itself constitute a market.

The following article looks at IBM's argument for a broader market than that presented in the Justice Department's brief for its antitrust case against IBM, slated to go to trial Feb. 18.

By Molly Upton
Of the CW Staff

The Justice Department contends the "general-purpose" computer market is comprised of eight firms in addition to IBM: Burroughs, Control Data Corp., Digital Equipment Corp., Honeywell, NCR, Singer, Sperry Rand and Xerox.

In its brief, IBM calls this supposition "preposterous."

Dr. Ruth M. Davis, director of the Institute for Computer Science and Technology at the National Bureau of Standards, observed that " 'the thought that the [DP] industry can be identified as consisting of eight mainframe manufacturers can charitably be called a myopic mythology,' " the IBM brief noted.

IBM's stance basically argues that the general-purpose digital computer market consists of more than 90 firms, and for a variety of reasons that market is not divisible into segments, much less into general-purpose systems, as distinct from systems used principally for specific purposes.

As Judge David N. Edelstein, who will be on the bench for the case, has stated, "A definition of the relevant market for purposes of this action will, at best, enable the court to determine the market share of IBM in that market. However, this alone will not reveal whether IBM has the power 'of controlling prices or unreasonably restricting competition,' . . . Market share is no holy talisman that alone determines whether a defendant has monopolized an industry . . . "

Justice Definitions

Justice defined its categories of markets as the "market" or "submarket" for general-purpose electronic digital computer systems (including hardware, software, maintenance and services); the "submarket" or "sub-submarket" for general-purpose electronic digital computer systems of varying sizes; and a similar category for "peripheral devices" attached to IBM CPUs.

There is also a "sub-sub-submarket" for individual types of "peripheral" devices used in IBM general-purpose electronic digital computer systems (e.g., disk and tape drives, terminals and add-on memories).

"The truth, of course, is that in pricing and marketing its tapes, disks and other devices, IBM competes with both peripheral suppliers and 'system' suppliers and that no market which excludes either is relevant," IBM said.

"The plain fact is that these 'submarkets' are irrational.

"The concept of 'small, medium and large' computer systems based on CPU prices makes no sense because the size, value and, in many cases, the merits of a computer system are determined by its peripheral equipment. Thus it is the number and price of the peripheral units which makes a system 'small, medium, or large,'" the brief noted.

Many of the most acerbic comments in the brief, prepared in eminently readable English, were located in the footnotes.

In amplifying the plaintiff's economic analysis, which divided IBM's competition into three categories of "Primary Systems Competition," "Secondary Systems Competition" and "Tertiary Competition," a footnote said, "This unique concept which plaintiff has recently conjured is an abrupt departure from economic and legal precedents and represents just another example of plaintiff's continuing efforts to increase IBM's market shares."

Among the firms listed by IBM as competitors manufacturing and marketing complete DP systems which were excluded from Justice's list are AT&T, Bunker Ramo Corp., Fairchild Camera & Instrument, Ford Motor Co., General Automation, Inc. and Harris Corp.

Still others include: Hughes Aircraft Co., Litton Industries, Inc., Lockheed Aircraft Corp., Mohawk Data Sciences Corp., Olivetti Corp. of America, Raytheon Co., Rockwell International and Teledyne, Inc.

Texas Instruments, Inc., TRW, Inc., Wang Laboratories and Westinghouse Electric Corp. complete the list.

Domestic DP revenues in 1972, as reported in the parties' census consisting of depositions taken, list AT&T with $706.3 million, Litton Industries, Inc. with $219.2 million, Lockheed Aircraft, $156.8 million and TRW, $109.5 million.

Justice also omitted firms that primarily manufacture and market "individual [DP] boxes, such as tapes, disks, memories, terminals, etc. such as Ampex Corp., Memorex Corp., Sanders Associates, Inc., Telex Corp. and several others."

Noting the Justice Department also omitted software firms and lessors from its list, IBM said, "any 'market' which ignores the competitive effect on IBM of these companies and their [DP] equipment and services is meaningless."

IBM also notes that the Justice Department argument that IBM tracks only a few firms in the DP industry is fallacious, observing that its Commercial Analysis Department tracks the prices and products of more than 3,500 DP companies.

Arguing against the fragmented market approach, IBM emphasized that "proper application of the principles of *du Pont* is of critical importance to this case because plaintiff's allegations of high market share are wholly dependent upon its attempt to carve out as its 'relevant markets' some narrow fragments of the [DP] industry, which exclude most of the firms, products and services which compete with IBM."

In the du Pont case, the Supreme Court upheld a district court definition of the relevant market for cellophane that encompassed "all the products, services and firms which in fact exerted competitive pressure on du Pont's pricing of cellophane," according to the IBM brief.

Important Factors

In defining relevant market, the two most important factors are substitutability of demand and substitutability of supply, both the plaintiff's and IBM's economic experts agree, the brief said.

Where either factor exists "a product must be included in the same relevant market," IBM said.

" "If buyers can shift on a large scale from product or area B to A, then the two should be combined. If producers can shift on a large scale from B to A, again they should be combined,' " noted G. Stigler in *Introduction to Business Concentration and Price Policy, A Conference of the Universities,* as cited in the brief.

"Demand substitutability exists when products are reasonably interchangeable . . . In determining whether products or services are reasonably interchangeable, the courts do not require that they be fungible or physically identical . . . Moreover, as *du Pont* clearly demonstrates, products used for the same general purpose should be included in the relevant market even though not all of those products perform all of the desired applications equally well," the brief continued.

"In addition, *Grinnell* teaches that where the relevant market consists of 'a number of different products or services', competitors need not offer *all* products or services in order for their offerings to be includible in that market," according to the brief.

"The primary factor to be considered in determining if supply substitutability exists is whether the manufacturers produce their products by application of basically similar technology or facilities," the brief said, explaining potential sources of supply limit the power of a producer to raise the price of its product.

General industry usage refers to stored-program computers as general-purpose computers, while Justice's definition would exclude those machines primarily used for scientific, process control, data entry, communications, seismographic, typesetting, military and other "dedicated applications," according to the brief.

The distinction between scientific machines and general-purpose machines are "fatuous," the IBM brief said.

Earnings Dip of $26 Million Affects Honeywell Year Results

MINNEAPOLIS – Honeywell, Inc.'s earnings for the fourth quarter and year ended Dec. 31 declined as a result of "business conditions and several unusual factors that lowered profits," the firm said.

Although 1974 revenues rose to $2.63 billion compared with $2.39 billion in 1973, earnings totaled $75.8 million compared with a restated $95.1 million in 1973.

As reported, last year's earnings were $103.9 million. Research and development costs are now being expensed as incurred.

The change in accounting effectively reduced 1974 earnings by $2.2 million, the firm said.

Three factors combined to reduce 1974 earnings by about $26 million, the firm said. These included an $8.8 million translation and foreign exchange loss stemming from long-term bond issues in Swiss francs; a $9.8 million provision against accounts receivable; and a corresponding reversal of computer revenues.

In addition, about $18 million was incurred as a result of domestic and overseas plant closings, consolidations and employment reductions.

A decline in other income and higher interest costs also adversely affected the year and fourth-quarter results, although these were partially offset by a reduction in income taxes resulting primarily from the settlement of prior year foreign income taxes and from investment tax credits, the firm said.

In the quarter, revenues rose to $766.5 million from $707.6 million in the year-ago period.

But fourth-quarter earnings declined to $27.7 million or $1.43 a share compared with $41.2 million or $2.16 a share last year, restated from $43.9 million.

(Continued on Page 36)

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We've selected leading experts from around the country to give seminars on some of the most important topics on today's EDP scene. These seminars are current, practically oriented, and packed with detailed information. They will help you save time and money. And they can give you the information you need to increase your installation's efficiency. In an increasingly complex and fast-changing EDP world, these seminars are even more important to your company, your installation, and you. Here is our current seminar schedule:

Data Communications

Course #1010 –

Practical Data Communications Systems and Concepts

This course will give you the information you need to master the newest developments in Data Communications. Led by the nationally recognized teleprocessing consultant, Dr. Dixon Doll, the course covers recent changes in areas like SDLC. HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of satellite carriers. This seminar runs two days, and total cost, including workbook, reference materials, luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule is as follows:

Chicago – Jun. 2-3
Orlando – Jul. 2-3
Washington, D. C. – Jun. 9-10

Course #1020 –

Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost-optimizing network organizations.

This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheons and continental breakfasts is $450. Additional registrants from the same company qualify for a reduced rate of $400. Current schedule is as follows:

Los Angeles – Jun. 16-18

Data Base Design

A practical approach to the design, implementation, and maintenance of data base systems.

Effective data base system design requires both a complete knowledge of the facilities provided by a data base package, and a basic understanding of the mechanisms which can be employed to construct data base systems. In fact, the former is of questionable value without the latter.

This course is a package independent examination of the techinques required for the design of effective data base systems. The topics covered include:

- *Effective Record Design*
- *Physical Storage Techniques*
- *Optimum File Organization and Indexing Techniques*
- *File Integration*
- *and much more*

Given in association with Leo J. Cohen and Performance Development Corporation, this course reinforces the lecture material with workshops, in which attendees apply the techniques just learned, to practical problems.

You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst.

This course runs for 3 days and costs $350., including course materials, continental breakfasts and luncheons. Additional registrants from the same company qualify for a reduced rate of $300. Current schedule:

Los Angeles	Los Angeles Marriott	March 3-5
Chicago	Sheraton O'Hare Motel	May 12-14
New York	The Plaza	June 2-4

Contracting for Computers and EDP Support Services

A seminar that can help you protect your EDP investment – and your system.

In an industry that's famous for its "promise them anything" attitude, you need good, effective contracts from the vendors that supply your installation. And this seminar gives you the information you need to get them. It will show you how to protect your installation from late deliveries, inadequate equipment or services and the costly disruptions that they can cause.

Course topics include the lease and purchase of computer systems, separate hardware and software – the purchase of time sharing, data processing services and consultation – and the use of facilities management.

Under the personal instruction of Roy N. Freed, a nationally known lawyer, author and expert in the field of computer law, you'll learn how to place yourself in a strong bargaining position, how to insure on-time delivery of exactly what you want, how to set reasonable performance standards for warranties – and much more. You'll also receive a complete resource notebook, *including sample vendor contract forms*.

You should attend this seminar if you are involved in the purchase of EDP equipment or services, whether as a corporate counsel, contract administrator, DP manager, consultant or officer of a using firm.

Cost for the entire 2½ day seminar, including complete resource notebook, continental breakfasts, luncheons and coffee breaks is $295.00. The current schedule:

Chicago	Hyatt Regency O'Hare	February 26-28
Atlanta	Stouffers Atlanta Inn	April 23-25
New York	St. Moritz	June 4-6

Performance Evaluation and Improvement

A seminar actually designed to save your installation money.

This course starts with a discussion of questions and specific problems attendees have about system performance at their own installation. Then step by step each attendee will learn the methodology necessary to understand the problems and implement the answers. The techniques presented at this seminar are in effect at numerous installations today, and have extended the life of one S/360 for more than two years – a savings, at last estimate, of more than $700,000 for one user.

Our course leader is Saul Stimler. His book, *Data Processing Systems: their performance, evaluation, measurement, and improvement,* will be an important part of the seminar. As well as case studies, topics that will be covered include:

- *Criteria for quantifying performance*
- *Pencil and paper analysis of a system*
- *Benchmarking techniques*
- *Realtime, batch, and interactive time sharing systems*

You should attend this seminar if you are a data processing professional or corporate executive whose responsibility it is to plan, benchmark, evaluate, or improve data processing systems.

Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials (including a copy of Saul Stimler's book on the subject) is only $250.

Current schedule:

New York **Waldorf-Astoria** **May 5-6**

THE EDP SEMINAR SERIES sponsored by COMPUTERWORLD

Key-to-Storage Systems

How to evaluate and optimize the various successors to keypunch equipment.

Data entry is a big problem – and a big headache – as every computer user knows. It is therefore a prime target for cost savings. This course is designed to help you in the practical aspects of selecting, installing, and making the best use of keyboard-to-storage systems. It is an expansion and an update of our successful key-disk seminar. Under discussion (including some user case studies) will be:

- Introduction to data entry concepts (keypunch, buffered keypunch, keypunch, key-disk and beyond . . .)
- Key-disk hardware and software
- Evaluating . . . and starting . . . key-disk systems
- Selecting and operating intelligent terminals, both key-to-cassette and key-to-floppy disk
- Key-disk as a remote batch terminal
- Supervisor functions; motivation
- Mixed Media systems
- Trends in Computer Data Entry

This seminar is lead by Lawrence Feidelman, President of Management Information Corporation, and one of America's leading experts on data entry. All participants will receive a copy of "Data Entry Today", Management Information Corporation's authoritative publication on every aspect of data entry, including a six-month update of this continuing reference service.

You should attend this seminar if you are concerned with optimization of your data entry shop, and especially if you are considering or currently using key-to-storage systems more advanced than basic keypunch. Cost for the 3-day seminar is $350, including continental breakfasts, luncheons, and all course materials. Additional registrants from the same company are charged only $300.

New York	Waldorf Astoria	April 21-23
Chicago	Hyatt Regency O'Hare	June 9-11

To: Ed Bride, Vice President, Editorial Services, Computerworld
797 Washington Street, Newton, Mass. 02160

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NOTE: If time is short, you may reserve space at any seminar by calling collect. Call Miriam Ober at (617) 965-5800.

In Western Electric Case

Milgo Motion Charges Unfair Licensing

By Ronald A. Frank
Of the CW Staff

MIAMI – Western Electric licensing practices for data set patents "discriminate in favor of data modems manufactured by Western Electric" and are in violation of the 1965 AT&T consent decree.

This was one of the charges filed last week by Milgo Electronic Corp. and its subsidiary, International Communications Corp. (ICC), in response to a Western Electric suit filed last December which alleged that Milgo/ICC had infringed certain data set patents owned by Western Electric.

The suit, filed in the U.S. District Court for Southern Florida, asked for an injunction against Milgo/ICC together with an award for damages arising out of the alleged infringements. ICC is a non-Bell modem supplier.

Milgo/ICC responded to the charges with a motion for summary judgment against Western Electric and AT&T on the grounds that both companies have discriminated against non-Bell modem suppliers. The motion charged that the 1965 consent decree required Western Electric to license its data set patents "to all licensees at nondiscriminatory royalty rates."

A Western Electric spokesman said the company had no comment since "we normally make our legal statements in court."

Milgo/ICC takes the position that Western Electric licensing practices discriminate in favor of data modems manufactured by Western Electric because licensees using Western-manufactured modems apparently pay no royalties, while all other licensees under Western's patents are required to pay royalties, the motion said.

"Western Electric and AT&T use improper licensing practices in that data communications users who own or lease data modems not manufactured by Western Electric are forced by AT&T to install and pay for Data Access Arrangements (DAA), so-called 'protective devices' between their modems and the AT&T switched (dial-up) telephone lines," the motion continued.

"AT&T does not require the use of DAAs and their attendant cost and inconvenience to the user where the modems . . . are manufactured by Western Electric," it said.

The Milgo/ICC motion said "these discriminatory practices are in violation of the existing consent decree and constitute a per se patent misuse by Western Electric."

Asks Dismissal

The Milgo/ICC motion filed in the district court asked that the Western Electric complaint be dismissed "until Western Electric has complied with the terms of the consent decree by curing the discrimination."

It further suggested a revision in Western Electric's licensing policy as one solution to eliminate the alleged discriminatory practices.

A spokesman for Milgo/ICC said if the motion for summary judgment is granted, Western Electric would then be obligated to compete fairly with others in the communications industry.

The motion for summary judgment was not meant to imply that ICC agrees it is using the Western Electric patents, an ICC spokesman said. ICC has not yet researched this question to determine an answer, he explained.

In any event, there will be no impact on ICC users, he said. If the court finds ICC guilty, the company could obtain a license to use the patents. But this would not affect data sets being supplied by ICC, he added.

Contracts

GTE Sylvania, Inc. has received a $3.6 million U.S. Army research and development contract for fabrication of the remote master station of a system that provides computer-controlled processing, data storage and retrieval.

Raytheon Data Systems has signed a contract with Bell Canada to supply an estimated $7.5 million worth of PTS-100 programmable data terminals which will be sold to the Trans-Canada Telephone System.

Vector General, Inc. has been awarded a contract by the University of California's Earthquake Observatory at Berkeley for a computer-based system that will expedite determining the location and magnitude of earthquakes.

IBM, Marion Co. Come to Terms

NEW YORK – Two down within three weeks. That's the scorecard of IBM negotiations terminating law suits against it.

For $150,000 in payment to William Marion Co., Inc. and credit for the purchase of certain parts, IBM has settled antiturst suits filed by Marion, a refurbisher of keypunches.

The Marion suits charged IBM was illegally tying in its maintenance agreements to the condition that Marion use only IBM parts.

IBM agreed to provide maintenance agreements for certain machines containing non-IBM parts, while Marion has agreed to stop using certain disputed non-IBM parts.

Spokesman said the suits were dismissed with prejudice, which means they cannot be settled again.

IBM recently settled a patent infringement suit brought against it by Bunker Ramo [CW, Jan. 29].

CSC Head Predicts

Recession Will Benefit the Services Industry

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES – The computer services industry will show "considerable strength" during the current recession and can expect a 20% annual growth rate for the next five years, according to William R. Hoover, chairman and president of Computer Sciences Corp. (CSC), who made that prediction at a recent meeting of financial analysts.

While pointing to some forecasts of slippage in hardware sales in 1975, Hoover said more firms will be turning to the service industry to get more out of their equipment and to reduce payroll costs.

The service industry, he said, is entering 1975 with a "positive growth posture," following a year in which it grew by about 20%.

Hoover called attention to several factors which will influence the computer industry during the next five years:

- The recession, which will boost demand for services and defer capital equipment expenditures.
- Increased use of computer services by the government.
- Technological change.

Hoover cited three major technical factors that will impact the entire industry: the rapid growth of minicomputers, IBM's Future System and a continued reduction in the cost of mass storage devices.

He predicted these factors would step up the trend toward "more effective distributive computing," a technique in which major systems functions are integrated.

"This will result in a significant increase in the complexity of computer systems and provide opportunities for very high technology computer companies capable of solving those problems," he said.

In addition, such systems offer users potential cost savings by enabling a number of business organizations to share the use of the central computers under a facilities management arrangement, he said.

Furthermore, the large number of minicomputers expected to be installed in coming years will benefit, not harm, the network time-sharing industry, Hoover noted, since most mini's can be linked to a communications network.

About 40% of computing costs today are for software activities. As the cost of hardware continues to decline and as the complexity of systems solutions increases, software costs will rise, he added.

No major breakthrough in software technology is expected in the next few years, he said.

Honeywell Earnings Down $26 Million

(Continued from Page 33)

Honeywell, however, is in better shape to face the recession than it was a year ago. "The company goes into 1975 with lower employment levels, tight control of costs, expectations of a continued improvement in productivity and extensive unused lines of credit," said President Edson W. Spencer.

"Lower cost levels and increased productivity resulting from reduced employment will benefit future performance in these operations," he noted.

In 1974, orders and backlogs, in addition to revenues, registered gains over the record year of 1973, but the high level of worldwide inflation and interest rates, the rapid decline in new housing starts and the slowdown in general economic conditions in the last part of the year combined to produce the decrease in earnings, he said.

Honeywell has contingency plans in case the recession is not corrected in the latter part of the year, he noted.

"The first part of the year will be difficult, and it is probable that the company's results in the first quarter will not compare favorably with the strong first quarter last year," Spencer said.

Computer Area

Honeywell's computer sales and revenues during the year rose 4.8% to $1.23 billion and rental and service revenues rose 4.2% to $691 million from $633 million last year.

Earnings in the computer area before allocation of interest expenses, income taxes and certain other unallocated items were down 29% to $53 million from $75 million in 1973.

Spencer attributed the decline in computer earnings to inflationary pressures, to a decrease in other income, to charges against 1974 earnings as a result of plant closings and consolidations and to charges to the reserve for adjustments of accounts receivables.

The level of revenues from outright sales and conversions was relatively strong in the fourth quarter and, as a result, was moderately ahead of 1973 for the year as a whole, although still less than planned, Spencer said.

Honeywell has achieved about a 10% cut in employment in computer operations. Price increases begun during the year should progressively benefit this segment.

Bookings for the Series 60 line exceeded $450 million in the eight months since its announcement, Spencer said, and initial shipments proceeded on schedule.

"We are pleased with the continued excellent reception of the new series by our users and with its competitive strength in the market place," he said.

Bookings and shipments increased over the 1973 levels, and backlog was larger at the end of the year.

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2:15- 3:00 Wrap-Up Panel

SPECIAL AFTERNOON SESSIONS
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It's easy to register for the Caravan.
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FORUM REGISTRATION FORM

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CMI Plans to OEM Semi Devices

BEDFORD, Mass. – As a by-product of Cambridge Memories, Inc.'s (CMI) efforts to internally develop and produce reliable semiconductor devices, the firm will offer its products on an OEM basis.

CMI's first semiconductor product, a 1K bit N channel metal oxide semiconductor (MOS), features statis random-access storage. Access speed is 60 nsec, and read/write cycle time is less than 20 nsec, the firm said.

In a static device, data does not need recharging; chips using either a refresh or charge-pump technique require special circuitry to regenerate storage locations, CMI said.

"As a systems manufacturer, Cambridge is responsible for total memory system performance, not just for the performance of one or several parts. Our design rules therefore emphasize maximum reliability, even if that means sacrificing some sectors of the external OEM market," explained Richard J. Egan, senior vice-president.

CMI plans to use the 1K chip in three memory systems, including add-on memories for IBM and Digital Equipment Corp. machines.

CMI decided to enter the semi business because of the semi's growing use in replacing core memories and the increasing cost of storage elements as a part of the total memory systems CMI builds.

"In the past five fiscal quarters, semiconductor products using memories have grown from less than 1% to 38% of our total shipments, and the rate continues to increase," Egan observed.

"Since in some memory system configurations memory devices represent about 50% of our cost of manufacturing, we hope to derive very significant product cost improvements as we integrate more of our own chips into finished systems," he added.

Evaluation quantities of the 1K chip will be available this April and limited production quantities will be available in the fourth quarter.

Ampex Tape Production Process Yields Uniform Core Batches

MARINA DEL RAY, Calif. – While semiconductor technology and cost reductions have been grabbing the spotlight lately, Ampex Corp. has been busily evolving a new way of producing cores that it claimed increases yields of uniform consistency and allows manufacture of billion core batches.

By utilizing the capabilities of its magnetic tape facility, Ampex derived the continuous core tape material process.

The cores produced have been named Unibit to indicate the "uniformity and uniqueness of each core," Ampex said.

"This advancement in core technology will give impetus to a sizable core memory market due to improved performance margins and the potential for future decreases in the per/bit cost of core memories," said Max Bennett, general manager of the Ampex Memory Products Division.

Test data on Unibit cores, which Ampex has designated as 1700 types, indicates an improvement in uniformity of core output, switching and peaking time in memory systems, Bennett said.

The continuous core tape process begins with the preparation of a homogenous liquid ferrite mixture or slurry which is evenly applied over a 12-in.-wide roll of release film moving over 100 ft/min through a modified reverse-roller coating device, he explained.

While moving, the ferrite material is dried in a 500-ft floater dryer. This yields a uniform core tape which is separated from the release paper and wound on a spool. The tape is then densified and reduced to the desired thickness on a rolling mill.

After the tape is slit, it is shipped to Ampex's core facilities where 18-mil cores are punched and fired.

Billion Batches

"The ability to produce billion core batches will mean greater uniformity in critical performance parameters from stack to stack for memory systems," Bennett said. "This ability will reduce much of the waste now encountered with cores produced by present methods." Cores from two different batches often have slightly different performance parameters and cannot be used in the same stack, according to Bennett.

"When you produce over 15 billion cores a year, the ability to produce a billion cores from one batch will result in considerable improvement in uniformity of critical performance parameters of wired stacks and consequently improve the memory systems margins," Bennett said.

Rockwell Continues SOS For Military

ANAHEIM, Calif. – Although Rockwell International Corp. has withdrawn from the commercial marketplace for silicon-on-sapphire (SOS) chips, causing General Automation to change its plans [CW, Jan. 8], it is continuing its emphasis on SOS for military programs.

A spokesman said the firm sees no viable commercial market for another one or two years, but added Rockwell will announce some long-range plans for commercial SOS applications soon.

Rockwell has created a new organization, Special Devices, to develop SOS and other advanced technologies to meet military specifications.

Tax Fraud Charges Brought Against 3M

WASHINGTON, D.C. – Minnesota Mining & Manufacturing Co. (3M) and two of its former officers have been indicted on tax fraud conspiracy charges in conjunction with the firm's $634,000 secret political fund.

Bert S. Cross, former chairman and chief executive officer until 1970, and Irwin R. Hansen, who recently resigned as vice-president of finance, were named in the indictment.

They were charged with conspiring to defraud the government by claiming $634,000 in fictitious deductions on the firm's income tax returns from 1963 to 1969.

The funds were "laundered" in Switzerland and returned to Hansen's office safe for distribution to political candidates and organizations, the indictment said.

Five current and former 3M officials are paying a total of $475,000 to the company as part of the settlement of a shareholder suit that demanded the return of any money used in illegal political contributions.

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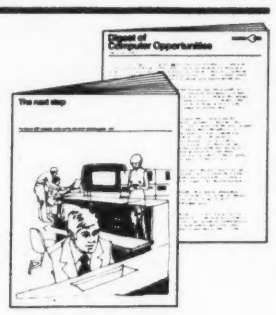

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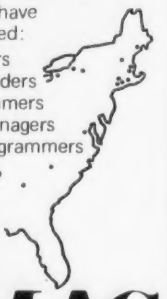

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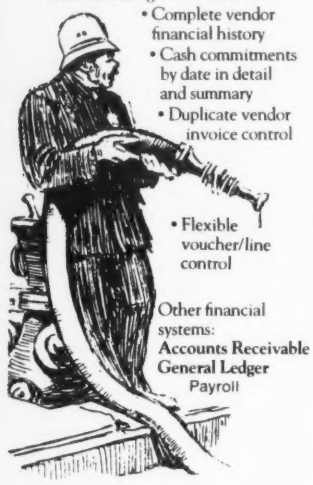
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T/S Firms See Quarter Revenues Rise

Revenues at two time-sharing firms, National CSS, Inc. and Comshare, Inc. increased for the third quarter and six months, respectively.

National CSS results just about lived up to third-quarter projections made by the firm. Revenues rose 34% to $8 million from $6 million in the year-ago period.

Earnings, however, declined because 1973 figures were buoyed by a $52,200 special credit. For the third quarter, earnings totaled $414,471 or 39 cents a share compared with $458,456 or 43 cents a share in the year-ago period.

The firm had earlier predicted a 35% revenue gain and earnings of 38 cents a share.

For the nine months, National CSS revenues rose to $24.7 million from $16.9 million and earnings reached $1.4 million or $1.25 a share compared with $1.3 million or $1.18 a share, when there was a $156,600 tax credit.

At Comshare, second-quarter revenues grew to $2.7 million from $2.3 million a year ago. But earnings declined to $287,011 or 21 cents a share compared with $325,917 or 25 cents a share in the same 1973 period, which included $115,065 in income ($57,000 after taxes) from the sale of a computer.

The 1973 period included $31,000 more in tax credits than in 1974.

In the six months, Comshare's earnings improved, aided by $299,911 in equipment sales revenues stemming from an OEM discount on sale of Xerox equipment to its joint-venture Japanese firm, Miroku-Comshare.

Revenues rose to $5.6 million compared with $4.5 million.

Earnings totaled $788,011 or 58 cents a share compared with $433,906 or 33 cents a share, which included the $115,065 income from the sale of a computer.

Comshare's 1973 results were restated to reflect a change in accounting to expensing software and systems development costs as incurred.

Leasing Company's Results Jump With Boost From Tax Credits

HARTSDALE, N.Y. – Thanks to a sizable credit from completion of a cash tender and tax credits, DPF, Inc. showed earnings increases for both the three and six months ended Nov. 30.

For the three months, revenues, including a $4.6 million gain on repurchase of debentures, rose to $10.8 million compared with $8 million in the year-ago period.

Earnings, including a $1.9 million tax credit, jumped to $4.1 million or 91 cents a share compared with $329,000 in the same 1973 period, when there was a $164,000 tax credit.

During the six months, the story was similar. A $6 million gain on the repurchase of debentures boosted revenues to $18.4 million from the year-ago figure of nearly $16 million.

Earnings, including a $2.1 million tax credit, totaled $4.5 million or $1.03 a share compared with $484,000 or 12 cents a share in last year's period, when there was a $242,000 tax credit.

DPF recently repurchased about $8.7 million in principal amount of its 5-1/2% convertible subordinated debentures.

Revenues from the firm's IBM 360 and other leasing operations declined in the 1974 periods from the 1973 figures. In the six months, leasing revenues declined to $12.3 million from $15 million a year ago, while three-month revenues were $6.2 million compared with $7.4 million last year.

Operating expenses, excluding depreciation, declined slightly.

DPF's present programs provide for increased security acquisitions and investments in new equipment leasing programs, which may reduce its existing cash position, said Chairman Bertram J. Cohn.

During the six months, DPF increased its cash position by nearly $1.4 million while it repaid almost $1.5 million of secured debt and spent $5.2 million for repurchase of its debentures and $532,000 for purchase of securities.

The operating results do not provide for pending settlement of the class action brought in 1970 on behalf of purchasers of the company's securities. Settlement will be reflected as a prior period adjustment, Cohn said.

Acquisitions

Media III Corp. has merged into Mini-Computer Systems Inc.'s subsidiary, **MCS Media Corp.**

Anderson Jacobson, Inc. has acquired the **Eldorado Computer Systems Division** of Eldorado Electrodata Corp.

Greyhound Computer Corp. has acquired **Pharm-a-Syst Systems, Inc.**

Data 100 Corp. has completed acquisition of **Odec, Inc.**, a maker of impact line printers. Odec will operate as a subsidiary of Data 100.

Grumman Data Systems Corp. has acquired exclusive rights to design, manufacture and market a printer controller which connects IBM 1403s to various CPUs and was developed by **Spur Products Corp.**

University Computing Co. has acquired **Michigan Well Log Service, which will operate as part of the UCC Energy Group.**

Earnings Reports

COMPUTER AUTOMATION
Three Months Ended Dec. 29

	1974	1973
Shr Ernd	$.19	$.24
Revenue	5,114,202	4,248,433
Earnings	320,613	401,632
6 Mo Shr	.31	.48
Revenue	10,251,184	8,153,432
Earnings	515,901	798,412

EBS DATA PROCESSING
Year Ended July 31

	1974	1973
Shr Ernd	$.01	$.04
Revenue	8,553,000	8,090,000
Earnings	61,700	204,000

OCEAN DATA SYSTEMS
Year Ended June 30

	1974	1973
Shr Ernd	$1.28	$1.18
Revenue	3,232,074	1,931,106
Tax Cred	.....	33,400
Earnings	160,166	141,843

WANG LABORATORIES
Three Months Ended Dec. 31

	1974	1973
Shr Ernd	$.18	$.25
Revenue	738,000	1,002,000
6 Mo Shr	.40	.45
Revenue	33,764,000	27,824,000
Earnings	1,615,000	1,820,000

L.O.A. DATA
Year Ended Sept. 30

	1974	1973
Shr Ernd	$.03	$.22
Revenue	4,976,720	4,489,880
Earnings	25,576	180,598

GRANITE MANAGEMENT SERVICES
Six Months Ended Aug. 31

	1974	1973
Revenue	$9,212,000	$10,637,000
Disc Op	.....	(197,000)
Loss	1,257,000	906,000

NUCLEAR DATA
Three Months Ended Nov. 30

	a1974	a1973
Revenue	$4,428,745	$4,374,027
Spec Item	a(16,000)	14,000
Earnings	(70,356)	113,608
9 Mo Rev	15,055,768	13,762,411
Spec Cred	170,000	144,000
Earnings	409,972	633,683

a-No common share earnings due to preferred dividend arrearages. b-Reduction in tax carryforward credit.

MICRODATA
Three Months Ended Nov. 30

	1974	1973
Shr Ernd	.....	$.12
Revenue	$3,441,735	2,535,709
Tax Cred	.....	79,000
Earnings	a(147,705)	184,011

a-After $250,000 allowance for possible losses resulting from bankruptcy of a major customer.

ADVANCED MEMORY SYSTEMS
Three Months Ended Dec. 27

	1974	1973
Shr Ernd	$.12	$.02
Revenue	7,503,000	7,375,000
Tax Cred	150,000	15,000
Earnings	306,000	31,000

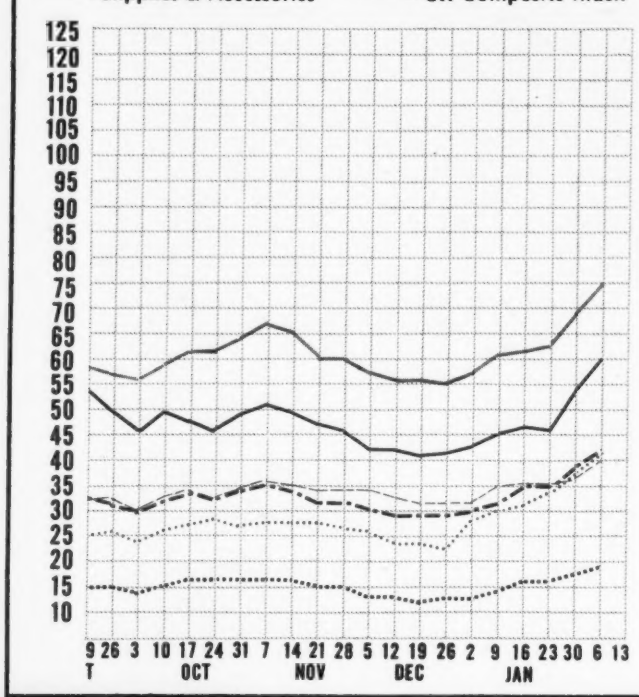
DATA DOCUMENTS
Three Months Ended Dec. 31

	1974	1973
Shr Ernd	$1.67	$1.13
Revenue	15,661,480	10,998,947
Tax Cred	3,000	39,000
Earnings	784,728	532,891

COMPUTER EXCHANGE
Three Months Ended Sept. 30

	1974	1973
Shr Ernd	$.04	.....
Revenue	931,902	$1,116,269
Tax Cred	4,025	.....
Earnings	25,057	(43,975)

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1974 RANGE (1)	CLOSE FEB 6 1975	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	62-109	78 7/8	+8	+11.2
O	COMPUTER AUTOMATION	2- 14	5 1/8	+ 1/2	+10.8
N	CONTROL DATA CORP	10- 38	13 5/8	0	0.0
N	DATA GENERAL CORP	10- 38	15 5/8	+2 1/4	+16.8
O	DATAPOINT CORP	5- 15	8	- 3/4	-8.5
O	DIGITAL COMP CONTROL	1- 5	1	0	0.0
N	DIGITAL EQUIPMENT	46-121	72	+7 7/8	+12.2
N	ELECTRONIC ASSOC.	1- 3	1 5/8	- 1/8	-7.1
A	ELECTRONIC ENGINEER.	4- 11	6 3/4	0	0.0
N	FOXBORO	19- 48	27 5/8	+3 1/8	+12.7
O	GENERAL AUTOMATION	6- 40	6 1/4	-1 3/8	-18.0
O	GRI COMPUTER CORP	1- 2	1/4	0	0.0
N	HEWLETT-PACKARD CO	54- 90	72	+6 1/8	+9.2
N	HONEYWELL INC	18- 86	28 7/8	+3 1/8	+12.1
N	IBM	152-251	196	+13 1/8	+7.1
O	INTERDATA INC	8- 22	18 3/8	+3 1/4	+21.4
O	MEMOREX	2- 5	3	+ 3/8	+14.2
O	MICRODATA CORP	1- 5	2 5/8	+ 1/2	+23.5
N	NCR	14- 40	20 1/8	+1 1/8	+5.9
N	RAYTHEON CO	21- 39	31 3/4	+2	+6.7
N	SINGER CO	10- 40	12 3/4	+1	+8.5
N	SPERRY RAND	24- 44	31 3/4	+1 3/4	+5.8
A	SYSTEMS ENG. LABS	1- 3	2	+ 5/8	+45.4
N	TEXAS INSTRUMENTS	60-115	77 5/8	+7 3/8	+10.4
O	ULTIMACC SYSTEMS INC	1- 2	1 3/4	+ 5/8	+55.5
N	VARIAN ASSOCIATES	6- 13	8 1/8	+ 5/8	+8.3
N	WANG LABS.	7- 20	10 1/8	+ 7/8	+9.4
N	XEROX CORP	50-127	73 3/8	+6 1/2	+9.7
	LEASING COMPANIES				
O	BRESNAHAN COMP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1- 7	1 7/8	0	0.0
A	COMMERCE GROUP CORP	2- 6	2 3/8	0	0.0
O	COMPUTER EXCHANGE	1- 1	3/8	0	0.0
A	COMPUTER INVSTRS GRP	0- 4	1 5/8	- 1/8	-7.1
O	COMP. INSTALLATIONS	1- 1	1/8	- 1/8	-50.0
M	DATRONIC RENTAL	1- 1	5/8	+ 1/8	+25.0
A	DCL INC	0- 1	1/2	+ 1/8	+33.3
N	DPF INC	2- 5	3 7/8	+ 1/4	+6.8
O	EDP RESOURCES	2- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 3	1 1/4	+ 1/4	+33.2
A	GREYHOUND COMPUTER	2- 6	2 1/2	0	0.0
A	ITEL	3- 6	5	0	0.0
N	LEASCO CORP	5- 12	7 3/4	+ 7/8	+12.7
O	LEASPAC CORP	1- 2	1/2	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 5	3 1/8	+1 3/8	+78.5
A	PIONEER TEX CORP	2- 10	2 3/4	+ 3/8	+15.7
A	ROCKWOOD COMPUTER	0- 1	5/8	+ 1/8	+25.0
N	U.S. LEASING	5- 24	12 3/4	- 1/2	-3.7
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	5/8	+ 1/8	+25.0
A	APPLIED DATA RES.	1- 3	1 3/4	+ 3/8	+27.2
O	APPLIED LOGIC	1- 1	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	37 1/4	+2	+5.6
O	BRANDON APPLIED SYST	1- 1	1/4	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	1 5/8	0	0.0
O	COMPUTER HORIZONS	1- 5	3/8	0	0.0
O	COMPUTER NETWORK	1- 2	1 1/8	+ 5/8	+125.0
N	COMPUTER SCIENCES	2- 4	2 5/8	+ 1/8	+5.0
O	COMPUTER TASK GROUP	1- 1	3/8	0	0.0
O	COMPUTER TECHNOLOGY	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	2 3/8	- 1/8	-5.0
O	COMRESS	1- 1	1/8	0	0.0
O	COMSHARE	2- 4	3 1/4	0	0.0
N	CORDURA CORP	1- 4	1 3/4	0	0.0
O	DATATAB	1- 3	1 1/4	+ 1/8	+11.1
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	11- 25	15 3/4	+4	+34.0
O	INFONATIONAL INC	1- 2	1/8	0	0.0
O	I.O.A. DATA CORP	1- 1	1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 1	3/8	+ 1/8	+50.0
O	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	1 7/8	0	0.0
O	LOGICON	2- 5	3 1/2	+ 1/4	+7.6
A	MANAGEMENT DATA	1- 2	1 1/2	0	0.0
O	NATIONAL CSS INC	5- 37	10 1/4	+1 1/4	+13.8
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	9- 30	11 3/8	-1 1/8	-9.0
N	PLANNING RESEARCH	2- 3	3	+ 3/8	+14.2
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	1- 5	2 1/8	0	0.0
O	SCIENTIFIC COMPUTERS	1- 1	1	0	0.0
O	SIMPLICITY COMPUTER	1- 1	1/4	0	0.0
O	TCC INC	1- 1	1/8	- 1/8	-50.0
O	TYMSHARE INC	6- 12	9 1/8	+1	+12.3
O	UNITED DATA CENTER	2- 4	2 7/8	0	0.0
A	URS SYSTEMS	2- 4	2 1/2	- 1/8	-4.7
N	WYLY CORP	1- 5	2 5/8	+ 1/8	+5.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	3- 11	5 3/8	+ 5/8	+13.1
O	ADVANCED MEMORY SYS	1- 7	2 1/4	- 3/8	-14.2
N	AMPEX CORP	2- 5	4 1/8	+ 3/4	+22.2
O	ANDERSON JACOBSON	1- 4	2 1/4	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 7	1 7/8	- 1/8	-6.2
A	BOLT,BERANEK & NEW	5- 9	6 5/8	+ 7/8	+15.2
N	BUNKER-RAMO	3- 8	6	+ 1/2	+9.0
A	CALCOMP	4- 11	4 1/2	0	0.0
O	CAMBRIDGE MEMORIES	3- 16	3 1/2	0	0.0
N	CENTRONICS DATA COMP	7- 23	11	+1 3/4	+18.9
O	CODEX CORP	8- 19	19	+2 1/4	+13.4
O	COGNITRONICS	1- 2	3/8	0	0.0
O	COMPUTER COMMUN.	1- 2	3/8	- 1/8	-25.0
A	COMPUTER EQUIPMENT	1- 2	1 3/4	+ 1/8	+7.6
O	COMPUTER MACHINERY	1- 5	1 1/2	+ 1/4	+20.0
O	COMPUTER TRANSCEIVER	1- 2	7/8	+ 1/4	+40.0
N	CONRAC CORP	10- 22	16	- 1/4	-1.5
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	0	0.0
O	DATA 100	4- 13	6 1/4	- 1/8	-1.9
A	DATA PRODUCTS CORP	2- 4	2 7/8	+ 1/4	+9.5
O	DATA RECOGNITION	1- 1	1/4	0	0.0
O	DATA TECHNOLOGY	2- 4	1 5/8	- 1/8	-7.1
O	DECISION DATA COMPUT	3- 13	4 3/4	- 3/4	-13.6
O	DELTA DATA SYSTEMS	1- 2	3/8	0	0.0
O	DI/AN CONTROLS	1- 2	5/8	0	0.0
N	ELECTRONIC M & M	1- 4	2 1/8	+ 1/2	+30.7
O	FABRI-TEK	1- 3	1 1/8	+ 1/4	+28.5
O	GENERAL COMPUTER SYS	1- 4	1 3/4	- 1/4	-12.5
N	GENERAL ELECTRIC	30- 65	40 1/8	+1 3/4	+4.5
N	HAZELTINE CORP	2- 7	3 1/2	- 1/4	-6.6
O	INFOREX INC	1- 5	2 1/2	- 1/8	-4.7
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	6- 14	9 3/4	0	0.0
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/4	0	0.0
A	MILGO ELECTRONICS	6- 18	10 7/8	+ 3/4	+7.4
N	MOHAWK DATA SCI	1- 4	2	- 1/4	-11.1
O	ODEC COMPUTER SYST.	1- 3	3/4	0	0.0
O	OPTICAL SCANNING	2- 6	2	+ 1/8	+6.6
O	PERTEC CORP	1- 6	2 5/8	+ 1/8	+5.0
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	3/4	+ 1/4	+50.0
O	QUANTOR CORP	2- 8	3 1/2	0	0.0
O	RECOGNITION EQUIP	2- 5	3 1/8	+ 1/4	+8.6
N	SANDERS ASSOCIATES	2- 8	3 5/8	+ 1/4	+7.4
O	SCAN DATA	1- 2	1 1/4	0	0.0
O	STORAGE TECHNOLOGY	6- 15	7 1/8	+1 1/8	+18.7
O	SYCOR INC	4- 13	6 3/4	+1	+17.3
O	TALLY CORP.	1- 4	1 7/8	+ 1/8	+7.1
O	TEC INC	1- 7	2 1/2	+ 1/4	+11.1
N	TEKTRONIX INC	18- 48	24 1/4	+1 1/4	+5.4
N	TELEX	1- 4	1 5/8	+ 1/4	+18.1
O	WANGCO INC	3- 13	4 7/8	+ 3/8	+8.3
O	WILTEK INC	1- 8	2 1/4	+ 1/2	+28.5
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	5	0	0.0
A	BARRY WRIGHT	4- 7	7	+1 1/8	+19.1
O	CYBERMATICS INC	1- 2	3/4	+ 1/8	+20.0
A	DATA DOCUMENTS	23- 54	34 7/8	+1 1/8	+3.3
O	DUPLEX PRODUCTS INC	6- 17	16	+1 1/2	+10.3
N	ENNIS BUS. FORMS	4- 7	5 7/8	+ 3/8	+6.8
O	GRAHAM MAGNETICS	5- 11	7 3/4	+1 1/2	+24.0
O	GRAPHIC CONTROLS	6- 11	11	+ 1/2	+4.7
N	3M COMPANY	43- 79	49 3/4	+4 5/8	+10.2
O	MOORE CORP LTD	33- 57	44	+ 3/4	+1.7
N	NASHUA CORP	16- 45	21	- 1/4	-1.1
O	REYNOLDS & REYNOLD	6- 35	14	+ 1/2	+3.7
O	STANDARD REGISTER	10- 16	15	+1	+7.1
O	TAB PRODUCTS CO	4- 11	7 1/4	+1 1/4	+20.8
N	UARCO	13- 23	19 1/4	+ 1/8	+0.6
A	WABASH MAGNETICS	3- 7	4 1/8	+ 1/4	+6.4
N	WALLACE BUS FORMS	14- 24	18 3/4	+ 3/4	+4.1

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